This document gives pertinent information concerning the reissuance of the VPDES Permit listed below. This permit is being processed as a **Major**, **Municipal** permit. The discharge results from the operation of a 3.0 MGD wastewater treatment plant. This permit action consists of updating the proposed effluent limits to reflect the current Virginia WQS, effective January 6, 2011, and updating permit language as applicable. The effluent limitations and special conditions contained in this permit will maintain the Water Quality Standards of 9VAC25-260-00 et seq.

1.	Facility Name and Mailing Address:	Town of Orange WWTP 119 Belleview Avenue Orange, VA 22960	SIC Code:	4952 WWTP
	Facility Location:	13222 Spicer's Mill Road Orange, VA 22960	County:	Orange
	Facility Contact Name:	Michelle Steinberger, Chief Operator	Telephone Number:	540-672-3112
2.	Permit No.:	VA0021385	Expiration Date:	6/12/2011
	Other VPDES Permits:	VAR051419, VAN020025		
	Other Permits:	None		
	E2/E3/E4 Status:	N/A		
3.	Owner Name:	The Town of Orange		
	Owner Contact / Title:	Greg Woods, Town Manager	Telephone Number:	540-672-5005
4.	Application Complete Date:	3/9/2011		
	Permit Drafted By:	Anna Westernik	Date Drafted:	3/15/2011
	Draft Permit Reviewed By:	Alison Thompson	Date Reviewed:	3/23/2011
	Draft Permit Reviewed By:	Bryant Thomas	Date Reviewed:	4/7/2011
	Public Comment Period:	Start Date: 7/1/2011	End Date:	8/1/2011
5.	Receiving Waters Information:	See **Attachment 1** for an explanation of the Flow Frequency Determination		
	Receiving Stream Name:	Rapidan River	Stream Code:	3-RAP
	Drainage Area at Outfall:	233 square miles	River Mile:	48.13
	Stream Basin:	Rappahannock River	Subbasin:	None
	Section:	4	Stream Class:	III
	Special Standards:	None	Waterbody ID:	VAN-E13R_RAP01A00
	7Q10 Low Flow:	2.7 MGD	7Q10 High Flow:	25 MGD
	1Q10 Low Flow:	1.5 MGD	1Q10 High Flow:	20 MGD
	Harmonic Mean Flow:	55 MGD	30Q5 Flow:	11 MGD
	303(d) Listed:	Yes	30Q10 Flow:	6.6 MGD
	TMDL Approved:	Yes (Bacteria)	Date TMDL Approved:	12/5/2007

6. Statutory or Regulatory Basis for Special Conditions and Effluent Limitations:

- ✓ State Water Control Law
- ✓ Clean Water Act
- ✓ VPDES Permit Regulation
- ✓ EPA NPDES Regulation
- EPA Guidelines
- ✓ Water Quality Standards
- ✓ Other (9 VAC 25-4, 9 VAC 25-720, 9 VAC 25-820)

7. Licensed Operator Requirements: Class I

8. Reliability Class: Class I

9. Permit Characterization:

	Private	✓	Effluent Limited		Possible Interstate Effect
	Federal	✓	Water Quality Limited	✓	Compliance Schedule Required
	State	✓	Toxics Monitoring Program Required	✓	Interim Limits in Permit
✓	POTW	✓	Pretreatment Program Required		Interim Limits in Other Document
✓	TMDL				

10. Wastewater Sources and Treatment Description:

This wastewater treatment plant completed an extensive upgrade and expansion in 2010 to include enchanced nutrient removal (ENR) with the issuance of a conditional certificate to operate dated December 22, 2010. A detailed description of the treatment process follows.

Primary Treatment- Two mechanical bar screens operating in parallel with a compacter system remove large debris prior to grit removal by a Grit King. Septage is received at a manhole located before the bar screens.

The existing primary clarifier, now known as the bio-augmentation tank, has remained in service to promote hydrolysis and acid fermentation. This will increase volatile fatty acids entering the downstream anoxic zones, enhancing nutrient removal. The existing secondary clarifier has been converted to function as a primary clarifier and an equalization basin, but will be demolished in the future. Provisions are made to recycle sludge through the bio-augmentation tank for the elutriation of these compounds. Additionally, water treatment plant sludge, plant drains, filter backwash, filtrate from the belt filter press, and decant from aerobic sludge digesters are received at this location. Transfer pumps convey this sidestream to the main activated sludge process.

Secondary Treatment - The biological process is the 4-stage Bardenpho System (a single sludge suspended growth process). The unit has a total volume of 1.5 MG based on an annual average daily flow of 3.0 MGD. The anticipated BOD load will be 4,620 lb/day or 38.5 lb/d/1000 ft^3 based on 0.90 MG in the nitrification and re-aeration basins.

Three treatment trains are provided with room to add one future train. The nitrification basin in each train is divided into two compartments. Because the waste strength is higher in the first basin, more air will be required in the upstream basin. Analysis shows that more than 50% of the BOD and 90% of the TKN is oxidized in the first chamber with an air flow requirement 50% higher in the first basin than the second. Coarse bubble diffusers are specified to insure adequate mixing during low loading periods when lower air flow rates will be necessary. Pumping is provided for return mixed liquor recycle flow for each train.

The volume of the second anoxic chamber was set equal to the volume of the first anoxic zone. Because denitrification rates for endogenous respiration are much lower in the second anoxic basin, an additional carbon source (e.g., MicroC Glycerin or methanol added at the head of the second anoxic zone) may need to be added during cold weather and has been included in the design. Additionally, each basin will be provided with floating or submersible mixers in the anoxic zone. Magnesium hydroxide may be added for pH control at the influent splitter box or treatment basins.

Secondary Clarification - Three 68-foot diameter circular clarifiers are present after secondary treatment. Room is available onsite for an additional unit in the future. Pumping is provided for return activated sludge at each secondary clarifier pump station. Alum or ferric chloride is added prior to secondary clarification at the secondary clarifier splitter box to assist in the removal of phosphorus or to aid in sedimentation, filtration, and dewatering of residuals. Sodium hypochlorite is added to the wiers of the clarifiers during May through September to control algal growth.

Effluent Filtration – Tertiary effluent filtration is achieved utilizing two cloth media filter units operated in parallel. Each filter unit has twelve disks totaling 646 ft^2 of filtration surface area per filter, which results in a total of 1,292 ft^2 of filtration area. The woven cloth media has a nominal pore opening of 10 microns that is capable of producing a low TSS effluent under a wide range of loading conditions. Under average flow conditions, the hydraulic loading rate will be approximately 1.6 gpm/ft^2 at 3.0 MGD. At peak flow conditions, the hydraulic loading rate will be approximately 4.3 gpm/ft^2 at 8.0 MGD. The filter system is fed via gravity flow.

Disinfection and Final Discharge – Disinfection is achieved through the use of two UV filter banks operating in parallel. After disinfection, the effluent flows through a Parshall Flume where it is metered and a 12-step cascade aerator. Discharge is to the Rapidan River through a 24-inch shore-based outfall approximately 500 feet downstream of a coffer dam.

The receiving stream in the discharge area is approximately 80' wide. Numerous storm water outfalls have been constructed on the treatment plant property in conjunction with the upgrade. They discharge to Laurel Run and Poplar Run.

See **Attachment 2** for a facility schematic/diagram.

TABLE 1
OUTFALL DESCRIPTION

Outfall Number	Discharge Sources	Treatment	Design Flow	Latitude / Longitude
001	Municipal Wastewater	See Item 10 above.	3.0 MGD	38° 15' 55.9"/78°09'20.9"
See **Attachment 3** for Madison Mills Quadrangle, DEQ #185C Topographic Map				

11. Sludge Treatment and Disposal Methods:

Digestion of sludge occurs in three aerobic digesters with a total volume of 0.69 MG. Dewatering of digested biological solids prior to offsite disposal is achieved by a one-meter belt filter press.

Polymer will be added at the belt filter press for thickening. At full loading and flow, approximately 3,300 lb of 15% solids cake will be produced. The press will dewater 3,400 lb/day of digested sludge. Sludge disposal is at the Orange County Landfill.

12. Discharges, Intakes, Monitoring Stations, Other Items in Vicinity of Discharge

TABLE 2
DISCHARGES, INTAKES & MONITORING STATIONS

ID/Permit Number	Facility Name	Latitude/Longitude	Associated Stream
PWSID No. 6137500	Town of Orange Water Supply Intake	38° 15' 56.9"/78° 9' 26.9'	Rapidan River
VA0053121	Town of Orange WTP Discharge	38° 15' 50"/78° 9' 22'	Poplar Run, UT
N/A	DEQ Monitoring Station 3-BFL000.90	38° 16' 34.9"/78°"10' 53"	Beautiful Run
N/A	DEQ Monitoring Station 3-RAP045.08	38° 16' 49"/78°'8' 25"	Rapidan River

TABLE 3
GENERAL PERMITS IN WATERBODY VAN E13R

Permit Type/Permit Number	Permit Name	Receiving Stream
Single Family Home/David Rutt Property	VAG406450	Laurel Run, UT
Petroleum/DS Market	VAG830380	Blue Run, UT
Storm Water Industrial/ Town of Orange STP	VAR051419	Laurel Run/Poplar Run
Storm Water Industrial/Madison County Landfill and Transfer Station	VAR051416	Rapidan River, UT
Storm Water Industrial/American Woodmark Orange Dimension Plant	VAR051040	Laurel Run, UT

13. Material Storage:

TABLE 4 MATERIAL STORAGE		
Materials Description	Volume Stored	Spill/Stormwater Prevention Measures
Alum	8,000 gallons	1
Magnesium Hydroxide	4,000 gallons	1
MicroC Glycerin	1,000 gallons	1
Sodium Hypochlorite	3 55-gallon barrels (one stored at each clarifier)	2

[1]These chemicals are stored in a concrete containment area that drains to the influent pump station.

[2] At each clarifier, sodium hypochlorite is kept in a portable containment shed with a drip pan that can hold up to two 55-gallon barrels of liquid. Due to the short shelf life and low use of the chemical, only one 55-gallon barrel will be stored at each clarifier that is in use.

14. Site Inspection: Performed by Anna Westernik and Jimmy Desai on December 7, 2010 (see **Attachment 4**).

15. Receiving Stream Water Quality and Water Quality Standards:

a. Ambient Water Quality Data

The Virginia Department of Environmental Quality ambient monitoring station 3-RAP045.08 is located on the Rapidan River approximately 3.0 miles downstream of the facility's discharge point. This segment of the Rapidan River is on the 303(d) list for not meeting the recreation use goal for the 2010 water quality assessment due to sufficient excursions from the maximum *E. coli* bacteria criterion at this monitoring station. A bacteria TMDL was approved for the Rapidan River by EPA on December 5, 2007 (see **Attachment 5**, Planning Statement).

Significant portions of the Chesapeake Bay and its tributaries are listed as impaired on Virginia's 303(d) list of impaired waters for not meeting the aquatic life use support goal and the 2010 Virginia Water Quality Assessment 305(b)/303(d) Integrated Report indicates that much of the mainstem Bay does not fully support this use support goal under Virginia's Water Quality Assessment guidelines. Nutrient enrichment is cited as one of the primary causes of impairment.

In response, the Virginia General Assembly amended the State Water Control Law in 2005 to include the *Chesapeake Bay Watershed Nutrient Credit Exchange Program.* This statute set forth total nitrogen and total phosphorus discharge restrictions within the bay watershed. Concurrently, the State Water Control Board adopted new water quality criteria for the Chesapeake Bay and its tidal tributaries. These actions necessitate the evaluation and the inclusion of nitrogen and phosphorus limits on discharges within the bay watershed.

b. Receiving Stream Water Quality Criteria

Part IX of 9VAC25-260(360-550) designates classes and special standards applicable to defined Virginia river basins and sections. The receiving stream, the Rapidan River, is located within Section 4 of the Rappahannock River Basin and classified as Class III water.

Class III waters must achieve a dissolved oxygen (D.O.) of 4.0 mg/L or greater, a daily average D.O. of 5.0 mg/L or greater, and a temperature that does not exceed 32°C at all times. Additionally, a pH of 6.0- 9.0 standard units (S.U.) must be maintained.

Attachment 6 details other water quality criteria applicable to the receiving stream.

1) Ammonia:

The fresh water, aquatic life water quality criteria for ammonia is dependent on the instream temperature and pH. The 90th percentile temperature and pH values are used because they best represent the critical conditions of the receiving stream.

Staff has re-evaluated the April 2007 through December 2010 receiving stream ambient monitoring data derived from DEQ Monitoring Station 3-RAP045.08 for pH and temperature and finds that the 90th percentile pH value of 7.6 S.U. differs significantly from the 90th percentile value of 7.2 S.U. used to establish ammonia criteria and subsequent effluent limits in the previous permit.

The 90th percentile pH of the effluent derived from maximum monthly pH values reported on February 2010 through January 2011 discharge monitoring reports is 8.1 S.U. Since there is no effluent temperature data, staff used a default value of 25° C for the annual temperature and an assumed 15° C for the wet season temperature to calculate ammonia criteria. Current Virginia Water Quality Criteria will be used to recalculate ammonia limits.

The 90th percentile calculations for pH and temperature are presented in **Attachment 7**.

2) Metals Criteria:
The Water Quality Criteria for some metals are dependent on the receiving stream's hardness (expressed as mg/L calcium carbonate). The average hardness of the receiving stream, derived from DEQ Monitoring Station 3-RAP045.08 data is 25 mg/L. The effluent hardness, derived from a November 11, 2010 sampling event reported in the VPDES permit application, is 68.6 mg/L. This value has been rounded to 69 mg/L in calculation of metals criteria. See **Attachment 6** for hardness-dependent metals criteria based on these values.

3) Bacteria Criteria:
The Virginia Water Quality Standards (9VAC25-260-170.A.) establishes the following criteria to protect primary contact recreational uses:

E. coli bacteria per 100 mL of water shall not exceed the following:

	Monthly Geometric Mean[1]
Freshwater *E. coli* (N/100 mL)	126

[1]Four or more samples taken during any calendar month

c. Receiving Stream Special Standards
The State Water Control Board's Water Quality Standards, River Basin Section Tables (9VAC25-260-360, 370 and 380) designates the river basins, sections, classes, and special standards for surface waters of the Commonwealth of Virginia. The receiving stream, the Rapidan River, is located within Section 4 of the Rappahannock River Basin. This section has not been designated with a special standard .

d. Threatened or Endangered Species
The Virginia DGIF Fish and Wildlife Information System Database was searched on January 4, 2011 for records to determine if there are threatened or endangered species in the vicinity of the discharge. The following threatened or endangered species were identified within a 2 mile radius of the discharge: Shenandoah Salamander, Peregrine Falcon, Upland Sandpiper, Loggerhead Shrike, Bald Eagle, Green Floater, and Loggerhead Migrant Shrike. The limits proposed in this draft permit are protective of the Virginia Water Quality Standards and therefore, protect the threatened and endangered species found near the discharge.

16. Antidegradation (9VAC25-260-30):

All state surface waters are provided one of three levels of antidegradation protection. For Tier 1 or existing use protection, existing uses of the water body and the water quality to protect these uses must be maintained. Tier 2 water bodies have water quality that is better than the water quality standards. Significant lowering of the water quality of Tier 2 waters is not allowed without an evaluation of the economic and social impacts. Tier 3 water bodies are exceptional waters and are so designated by regulatory amendment. The antidegradation policy prohibits new or expanded discharges into exceptional waters.

This receiving stream has been classified as Tier 1 because the treatment plant was constructed before adoption of the Virginia Water Quality Standards on March 30, 1992 and the effluent limitations were established to meet the water quality standards. Permit limits proposed have been established by determining wasteload allocations that will result in attaining and/or maintaining all water quality criteria applicable to the receiving stream, including narrative criteria. These wasteload allocations will provide for the protection and maintenance of all existing uses.

17. Effluent Screening, Wasteload Allocation, and Effluent Limitation Development:

To determine water quality-based effluent limitations for a discharge, the suitability of data must first be determined. Data is suitable for analysis if one or more representative data points are equal to or above the quantification level ("QL") and the data represent the exact pollutant being evaluated.

Next, the appropriate Water Quality Standards are determined for the pollutants in the effluent. Then, the Wasteload Allocations (WLAs) are calculated. The WLAs values are then compared with available effluent data to determine the need for effluent limitations. Effluent limitations are needed if the 97th percentile of the daily effluent concentration values is greater than the acute wasteload allocation or if the 97th percentile of the four-day average effluent concentration values is greater than the chronic wasteload allocation. Effluent limitations are then calculated on the most limiting WLA, the required sampling frequency and statistical characteristics of the effluent data.

a. Effluent Screening

Effluent data obtained from the permit application (EPA Form 2A) and the discharge monitoring reports (DMRs) has been reviewed and determined to be suitable for evaluation. Please see **Attachment 8** for a summary of effluent data. The following pollutants require a wasteload allocation analysis: antimony, chromium, copper, lead, mercury, nickel, and zinc.

Wasteload allocations (WLAs) are calculated for those parameters in the effluent with the reasonable potential to cause an exceedance of water quality criteria. The basic calculation for establishing a WLA is the steady state complete mix equation:

$$WLA = \frac{C_o [Q_e + (f) (Q_s)] - [(C_s) (f) (Q_s)]}{Q_e}$$

Where:
- WLA = Wasteload allocation
- C_o = In-stream water quality criteria
- Q_e = Design flow
- Q_s = Critical receiving stream flow (1Q10 for acute aquatic life criteria; 7Q10 for chronic aquatic life criteria; harmonic mean for carcinogen-human health criteria; 30Q10 for ammonia criteria; and 30Q5 for non-carcinogen human health criteria)
- f = Decimal fraction of critical flow
- C_s = Mean background concentration of parameter in the receiving stream.

The Water Quality Standards contain two distinct mixing zone requirements. The first requirement is general in nature and requires the "use of mixing zone concepts in evaluating permit limits for acute and chronic standards in 9VAC25-260-140.B". The second requirement is specific and establishes special restrictions for regulatory mixing zones "established by the Board".

The Department of Environmental Quality uses a simplified mixing model to estimate the amount of mixing of a discharge with the receiving stream within specified acute and chronic exposure periods. The simplified model contains the following assumptions and approximations:

- The effluent enters the stream from the bank, either via a pipe, channel or ditch.
- The effluent velocity isn't significantly greater (no more than 1 - 2 ft/sec greater) than the stream velocity.
- The receiving stream is much wider than its depth (width at least ten times the depth).
- Diffusive mixing in the longitudinal direction (lengthwise) is insignificant compared with advective transport (flow).
- Complete vertical mixing occurs instantaneously at the discharge point. This is assumed since the stream depth is much smaller than the stream width.
- Lateral mixing (across the width) is a linear function of distance downstream.
- The effluent is neutrally buoyant (e.g. the effluent discharge temperature and salinity are not significantly different from the stream's ambient temperature and salinity).

- Complete mix is determined as the point downstream where the variation in concentration is 20% or less across the width and depth of the stream.
- The velocity of passing and drifting organisms is assumed equal to the stream velocity.

If it is suitably demonstrated that a reasonable potential for lethality or chronic impacts within the physical mixing area doesn't exist, then the basic complete mix equation, with 100% of the applicable stream flow, is appropriate. If the mixing analysis determines there is a potential for lethality or chronic impacts within the physical mixing area, then the proportion of stream flow that has mixed with the effluent over the allowed exposure time is used in the basic complete mix equation. As such, the wasteload allocation equation is modified to account for the decimal fraction of critical flow (f).

Staff derived wasteload allocations where parameters are reasonably expected to be present in an effluent (e.g., total residual chlorine where chlorine is used as a means of disinfection) and where effluent data indicate the pollutant is present in the discharge above quantifiable levels. With regard to the Outfall 001 discharge, ammonia as N is likely present since this is a WWTP treating sewage, total residual chlorine may be present since chlorine is used to clean clarifier wiers during May through September, and DMR and EPA Form 2A data indicate antimony, chromium, copper, lead, mercury, nickel, and zinc are present in the discharge. **Attachment 6** details the mixing analysis results and WLA derivations for these pollutants.

b. Effluent Limitations, Outfall 001 – Toxic Pollutants

9VAC25-31-220.D. requires limits be imposed where a discharge has a reasonable potential to cause or contribute to an in-stream excursion of water quality criteria. Those parameters with WLAs that are near effluent concentrations are evaluated for limits.

The VPDES Permit Regulation at 9VAC25-31-230.D. requires that monthly and weekly average limitations be imposed for continuous discharges from POTWs and monthly average and daily maximum limitations be imposed for all other continuous non-POTW discharges.

1). Ammonia as N/TKN:

Staff reevaluated pH and temperature data and has concluded it is significantly different than what was used previously to derive ammonia criteria (see Section 15.b.1) of this fact sheet). Therefore, staff used this data to determine new ammonia water quality criteria, new wasteload allocations (WLAs) and new ammonia limits of 4.7 mg/L monthly average and 5.9 mg/L weekly average (**Attachment 9**). DEQ guidance suggests using a sole data point of 9.0 mg/L to ensure the evaluation adequately addresses the potential for ammonia to be present in the discharge containing domestic sewage.

The dissolved oxygen model (**Attachment 8**) was run in February 2011 for the 3.0 MGD flow tier using the current permit TKN value of 7.0 mg/L. The model indicates that a TKN of 7.0 mg/L is protective of the dissolved oxygen standard. Based on the assumption that ammonia represents almost half the TKN concentration, a TKN of 7.0 mg/L should be protective of the instream ammonia criteria. Hence, the TKN limit of 7.0 mg/L shall remain in the permit with monitoring at the same frequency as ammonia (5D/week).

2). Total Residual Chlorine:

Chlorine is not used for disinfection at this facility. However, it is added to the wiers of the clarifiers during May through September to control algal growth. In accordance with current DEQ guidance, staff used a default data point of 0.2 mg/L and the calculated WLAs to derive limits. A monthly average of 0.010 mg/L and a weekly average limit of 0.012 mg/L are proposed for this discharge for the months of May, June, July, August, and September (see **Attachment 9**).

3). Metals/Organics:

Limits are needed for copper (9.6 µg/L) and zinc (87 µg/L). Evaluations for chromium, lead, mercury, and nickel demonstrate that no limits are necessary for these pollutants because a reasonable potential to exceed the water quality standards is not exhibited.

The human health criteria value for antimony (640 µg/L) far exceeds the antimony concentrations found in the effluent (0.39 µg/L and 0.31 µg/L). Therefore, limits for antimony are not needed.

See **Attachment 9** for derivation of metals limits.

c. Effluent Limitations and Monitoring, Outfall 001 – Conventional and Non-Conventional Pollutants

No changes to Dissolved Oxygen (D.O.), Carbonaceous Biochemical Oxygen Demand ($cBOD_5$), Total Suspended Solids (TSS), Total Kjeldahl Nitrogen (TKN), and pH limitations are proposed.

D.O., TKN, and $cBOD_5$ limitations are based on the stream modeling conducted in February 2011 (**Attachment 10**) and are set to meet the water quality criteria for D.O. in the receiving stream.

It is staff's practice to equate the Total Suspended Solids limits with the $cBOD_5$ limits since the two pollutants are closely related in terms of treatment of domestic sewage.

pH limitations are set at the water quality criteria.

E. coli limitations are in accordance with the Water Quality Standards (9VAC25-260-170).

d. Effluent Annual Average Limitations and Monitoring, Outfall 001 – Nutrients
VPDES Regulation 9VAC25-31-220(D) requires effluent limitations that are protective of both the numerical and narrative water quality standards for state waters, including the Chesapeake Bay.

As discussed in Section 15, significant portions of the Chesapeake Bay and its tributaries are listed as impaired with nutrient enrichment cited as one of the primary causes. Virginia has committed to protecting and restoring the Bay and its tributaries. There are three regulations that necessitate the inclusion of nutrient limitations:

- 9VAC25-40 – *Regulation for Nutrient Enriched Waters and Dischargers within the Chesapeake Bay Watershed* requires new or expanding discharges with design flows of $\geq$ 0.04 MGD to treat for TN and TP to either BNR levels (TN = 8 mg/L; TP = 1.0 mg/L) or SOA levels (TN = 3.0 mg/L and TP = 0.3 mg/L).

- 9VAC25-720 – *Water Quality Management Plan Regulation* sets forth TN and TP maximum wasteload allocations for facilities designated as significant discharges, i.e., those with design flows of $\geq$ 0.5 MGD above the fall line and $\geq$ 0.1 MGD below the fall line. This regulation limits the total nitrogen and total phosphorus mass loadings from these discharges.

- 9VAC25-820 – *General Virginia Pollutant Discharge Elimination System (VPDES) Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia* became effective 1 January 2007. This regulation specifies and controls the nitrogen and phosphorus loadings from facilities and specifies facilities that must register under the general permit. Nutrient loadings for those facilities registered under the general permit as well as compliance schedules and other permit requirements, shall be authorized, monitored, limited, and otherwise regulated under the general permit and not this individual permit. This facility has coverage under this General Permit; the permit number is VAN020025.

Monitoring for Nitrates + Nitrites, Total Kjeldahl Nitrogen, Total Nitrogen, and Total Phosphorus are included in this permit. The monitoring is needed to protect the Water Quality Standards of the Chesapeake Bay. Monitoring frequencies are set at the frequencies set forth in 9VAC25-820.

Annual average effluent limitations, as well as monthly and year to date calculations for Total Nitrogen and Total Phosphorus are included in this individual permit.

Concentration limits of 4.0 mg/L TN annual average and 0.3 mg/L TP annual average are needed based on 9VAC40-70.A.(4). The limits are based in part on the WLA assigned to the facility in 9VAC25-720. Loading limits will be governed by the general permit mentioned above.

e. Effluent Limitations and Monitoring Summary.
Effluent limitations and monitoring are presented in the following tables. Limits and monitoring were established for pH, $cBOD_5$, Total Suspended Solids, Dissolved Oxygen, Total Kjeldahl Nitrogen, *E. coli*, Nitrate+Nitrite, Total Nitrogen, Total Phosphorus, Total Residual Chlorine, Total Recoverable Copper, Total Recoverable Zinc, and Chronic Toxicity.

It is staff's practice to equate the Total Suspended Solids limits with the $cBOD_5$ limits. TSS limits are established to equal the $cBOD_5$ limits since the two pollutants are closely related in terms of treatment of domestic sewage.

The mass loading (kg/d) for monthly and weekly averages, were calculated by multiplying the concentration values (mg/L) with the flow values (in MGD) and a conversion factor of 3.785.

The mass loading (lb/d) for TKN monthly and weekly averages were calculated by multiplying the concentration values (mg/L), with the flow values (in MGD) and then a conversion factor of 8.3438.

Sample Type and Frequency are in accordance with the recommendations in the VPDES Permit Manual and the Monitoring Requirements in 9 VAC 25-820-70.E.1, *General VPDES Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia.*

The VPDES Permit Regulation at 9VAC25-31-30 and 40 CFR Part 133 require that the facility achieve at least 85% removal for BOD/cBOD and TSS (or 65% for equivalent to secondary). The limits in this permit are water-quality-based effluent limits and result in greater than 85% removal.

The established effluent limitations are expressed as two (2) significant figures. This is consistent with current agency guidance (see Guidance Memo No. 06-2016).

18. Antibacksliding:

All limits in this permit are at least as stringent as those previously established. Backsliding does not apply to this reissuance.

19. Effluent Limitations/Monitoring Requirements:

Design flow is 3.0 MGD.
Effective Dates: During the period beginning with the permit's effective date and lasting until the expiration date.

PARAMETER	BASIS FOR LIMITS	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS	
		Monthly Average	Weekly Average	Minimum	Maximum	Frequency	Sample Type
Flow (MGD)	NA	NL	NA	NA	NL	Continuous	TIRE
pH	1	NA	NA	6.0 S.U.	9.0 S.U.	1/D	Grab
$cBOD_5$	1,2	10 mg/L 110 kg/day	15 mg/L 170 kg/day	NA	NA	5D/W	24H-C
Total Suspended Solids (TSS)	3	10 mg/L 110 kg/day	15 mg/L 170 kg/day	NA	NA	5D/W	24H-C
Dissolved Oxygen (DO)	1	NA	NA	6.0 mg/L	NA	1/D	Grab
Total Kjeldahl Nitrogen (TKN)	1,2,3	7.0 mg/L 170 lb/day	11 mg/L 270 lb/day	NA	NA	5D/W	24H-C
E. coli (Geometric Mean)	1	126 n/100 mL	NA	NA	NA	1/D (10 a.m.-4 p.m.)	Grab
Total Residual Chlorine (May – Sep)	1	0.010 mg/L	0.012 mg/L	NA	NA	1/D	Grab
Nitrate+Nitrite, as N	1,4	NL mg/L	NA	NA	NA	1/W	24H-C
Total Nitrogen [a.]	1,4	NL mg/L	NA	NA	NA	1/W	Calculated
Total Nitrogen – Year to Date [b.]	1,4	NL mg/L	NA	NA	NA	1/M	Calculated
Total Nitrogen – Calendar Year [b.]	1,4	4.0 mg/L	NA	NA	NA	1/Y	Calculated
Total Phosphorus	1	NL mg/L	NA	NA	NA	1/W	24H-C
Total Phosphorus – Year to Date [b.]	1,4	NL mg/L	NA	NA	NA	1/M	Calculated
Total Phosphorus – Calendar Year [b.]	1,4	0.3 mg/L	NA	NA	NA	1/Y	Calculated
Copper, Total Recoverable	1	9.6 µg/L	9.6 µg/L	NA	NA	1/M	Grab
Zinc, Total Recoverable[c]	1	87 µg/L	87 µg/L	NA	NA	1/Q[d]	Grab
Total Hardness	3	NA	NL	NA	NA	1/Q[d]	Grab
Chronic Toxicity – *C. dubia* (TU_c)	NA	NA	NA	NA	NL	1/Q[e]	24H-C
Chronic Toxicity – *P. promelas* (TU_c)	NA	NA	NA	NA	NL	1/Q[e]	24H-C

The basis for the limitations codes are:

1. Water Quality Standards
2. Stream Model (**Attachment 10**)
3. Best Professional Judgment
4. 9VAC25-40 (Nutrient Regulation)

MGD = Million gallons per day.
NA = Not applicable.
NL = No limit; monitor and report.
TIRE = Totalizing, indicating and recording equipment.
S.U. = Standard units.

1/D = Once every day.
5D/W = Five days a week.
1/W = Once per week.
1/M = Once every month.
1/Y = Once every calendar year.
1/Q = Once every calendar quarter.

24H-C = A flow proportional composite sample collected manually or automatically and discretely or continuously for the entire discharge of the monitored 24-hour period. Where discrete sampling is employed, the permittee shall collect a minimum of 24 (twenty-four) aliquots for compositing. Discrete sampling may be flow proportioned either by varying the time interval between each aliquot or the volume of each aliquot. Time composite samples consisting of a minimum 24 (twenty-four) grab samples obtained at hourly or smaller intervals may be collected where the permittee demonstrates that the discharge flow rate (gallons per minute) does not vary by 10% or more during the monitored discharge.

Grab = An individual sample collected over a period of time not to exceed 15-minutes.

a. Total Nitrogen = Sum of TKN plus Nitrate+Nitrite
b. See Section 20.a. for the calculation of the Nutrient Calculations.
c. See Part I.C. of the permit for the Schedule of Compliance.
d. The quarterly monitoring periods shall be January 1 - March 31, April 1 - June 30, July 1 - September 30 and October 1 - December 31. The DMR shall be submitted no later than the 10th day of the month following the monitoring period (April 10, July 10, October 10 and January 10, respectively).\
e. The monitoring frequency shall be reduced to an annual frequency after eight consecutive satisfactory monitoring events (see Section I.D of the permit).

20. Other Permit Requirements:

a. Part I.B. of the permit contains quantification levels and compliance reporting instructions.
9VAC25-31-190.L.4.c. requires an arithmetic mean for measurement averaging and 9VAC25-31-220.D. requires limits be imposed where a discharge has a reasonable potential to cause or contribute to an in-stream excursion of water quality criteria. Specific analytical methodologies for toxics are listed in this permit section as well as quantification levels (QLs) necessary to demonstrate compliance with applicable permit limitations or for use in future evaluations to determine if the pollutant has reasonable potential to cause or contribute to a violation. Required averaging methodologies are also specified.

The calculations for the Nitrogen and Phosphorus parameters shall be in accordance with the calculations set forth in 9VAC25-820 *General Virginia Pollutant Discharge Elimination System (VPDES) Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia.* §62.1-44.19:13 of the Code of Virginia define how annual nutrient loads are to be calculated; this is carried forward in 9VAC25-820-70. As annual concentrations (as opposed to loads) are limited in the individual permit, these reporting calculations are intended to reconcile the reporting calculations between the permit programs, as the permittee is collecting a single set of samples for the purpose of ascertaining compliance with two permits.

b. Part I.C. of the permit details the requirements for a Schedule of Compliance.
The VPDES Permit Regulation at 9VAC25-31-250 allows use of compliance schedules to allow facilities sufficient time for upgrades to meet newly established effluent limits. The permit contains newly established limits for total recoverable zinc. Since the facility was not designed to meet these limits, a schedule of compliance is required to provide the permittee time for facility upgrade. The permittee shall achieve compliance with the final limits specified in Part I.A. of the VPDES permit in accordance with the following schedule as contained in Part I.C. of the permit:

Action	Time Frame
1. Select engineering firm for design of facilities or submit proposed plan to achieve compliance with final limits.	Within 180 days after the effective date of the permit.
2. Report of progress on attainment of final limits.	The first annual report is due twelve months after the effective date.
3. Achieve compliance with final limits.	Within 4 years from the effective date of the permit.

c. Permit Section Part I.D., details the requirements for Toxics Management Program.
The VPDES Permit Regulation at 9VAC25-31-210 requires monitoring and 9VAC25-31-220.I., requires limitations in the permit to provide for and assure compliance with all applicable requirements of the State Water Control Law and the Clean Water Act. A TMP is imposed for municipal facilities with a design rate >1.0 MGD; with an approved pretreatment program or those required to develop a pretreatment program; or facilities determined by the Board based on effluent variability, compliance history, in-stream waste concentration, and receiving stream characteristics to require a program. See **Attachment 11**).

d. Permit Section Part I.E. details the requirements of a Pretreatment Program.
The VPDES Permit Regulation at 9 VAC 25-31-730. through 900., and 40 CFR Part 403 requires POTWs with a design flow of >5 MGD and receiving from Industrial Users (IUs) pollutants that pass through or interfere with the operation of the POTW or are otherwise subject to pretreatment standards to develop a pretreatment program.

The Town of Orange WWTP is a POTW with a design capacity of 3.0 MGD and an inactive, approved pretreatment program. Pretreatment program conditions for this permit reissuance are included in Part I.E of the VPDES permit. Currently there are no significant industrial users discharging to the Town of Orange WWTP.

21. Other Special Conditions:

a. 95% Capacity Reopener. The VPDES Permit Regulation at 9VAC25-31-200.B.4. requires all POTWs and PVOTWs develop and submit a plan of action to DEQ when the monthly average influent flow to their sewage treatment plant reaches 95% or more of the design capacity authorized in the permit for each month of any three consecutive month period. This facility is a POTW.

b. Indirect Dischargers. Required by VPDES Permit Regulation, 9VAC25-31-200 B.1. and B.2. for POTWs and PVOTWs that receive waste from someone other than the owner of the treatment works.

c. O&M Manual Requirement. Required by Code of Virginia §62.1-44.19; Sewage Collection and Treatment Regulations, 9VAC25-790; VPDES Permit Regulation, 9VAC25-31-190.E. Future changes to the facility must be addressed by the submittal of a revised O&M Manual within 90 days of the changes. Non-compliance with the O&M Manual shall be deemed a violation of the permit.

d. CTC, CTO Requirement. The Code of Virginia § 62.1-44.19; Sewage Collection and Treatment Regulations, 9VAC25-790 requires that all treatment works treating wastewater obtain a Certificate to Construct prior to commencing construction and to obtain a Certificate to Operate prior to commencing operation of the treatment works.

e. Licensed Operator Requirement. The Code of Virginia at §54.1-2300 et seq. and the VPDES Permit Regulation at 9VAC25-31-200.C., and Rules and Regulations for Waterworks and Wastewater Works Operators (18VAC160-20-10 et seq.) requires licensure of operators. This facility requires a Class I Operator.

f. Reliability Class. The Sewage Collection and Treatment Regulation at 9VAC25-790 require sewage treatment works to achieve a certain level of reliability in order to protect water quality and public health consequences in the event of component or system failure. Reliability means a measure of the ability of the treatment works to perform its designated function without failure or interruption of service. This facility is required to meet a Reliability Class of I.

g. Sludge Reopener. The VPDES Permit Regulation at 9VAC25-31-220.C. requires all permits issued to treatment works treating domestic sewage (including sludge-only facilities) include a reopener clause allowing incorporation of any applicable standard for sewage sludge use or disposal promulgated under Section 405(d) of the CWA. The facility includes a sewage treatment works.

h. Sludge Use and Disposal. The VPDES Permit Regulation at 9VAC25-31-100.P; 220.B.2., and 420 through 720, and 40 CFR Part 503 require all treatment works treating domestic sewage to submit information on their sludge use and disposal practices and to meet specified standards for sludge use and disposal. The facility includes a treatment works treating domestic sewage.

i. E3/E4 9VAC25-40-70.B. authorizes DEQ to approve an alternate compliance method to the technology-based effluent concentration limitations as required by subsection A of this section. Such alternate compliance method shall be incorporated into the permit of an Exemplary Environmental Enterprise (E3) facility or an Extraordinary Environmental Enterprise (E4) facility to allow the suspension of applicable technology-based effluent concentration limitations during the period the E3 or E4 facility has a fully implemented environmental management system that includes operation of installed nutrient removal technologies at the treatment efficiency levels for which they were designed.

j. Nutrient Reopener. 9VAC25-40-70.A. authorizes DEQ to include technology-based annual concentration limits in the permits of facilities that have installed nutrient control equipment, whether by new construction, expansion or upgrade. 9VAC25-31-390.A. authorizes DEQ to modify VPDES permits to promulgate amended water quality standards.

k. PCB Monitoring The permittee shall monitor the effluent at Outfall 001 for Polychlorinated Biphenyls (PCBs). DEQ will use these data for the development of the PCB TMDL for the Rappahannock River and for the Rappahannock River Watershed. The permittee shall conduct the sampling and analysis in accordance with the requirements specified below. At a minimum:

1) Monitoring and analysis shall be conducted in accordance with the most current version of EPA Method 1668 (The current approved version is 1668B (EPA 2008)) or other equivalent methods capable of providing low-detection level, congener specific results. Any equivalent method shall be submitted to DEQ-NRO for review and approval prior to sampling and analysis. It is the responsibility of the permittee to ensure that proper QA/QC protocols are followed during the sample gathering and analytical procedures.

2). The permittee shall collect 2 wet weather samples and 2 dry weather samples during the term of the permit.

Wet weather samples shall be defined by the permittee based on the permittee's decision criteria for their facility. The wet weather decision criteria shall be submitted to DEQ-NRO prior to any PCB sampling and within 90 days of the permit reissuance for review and approval. The permittee shall maintain documentation to demonstrate that wet

weather flows achieve these criteria. The documentation shall be available to DEQ-NRO upon request.

Dry weather samples are defined as those taken at Outfall 001 following at least a 72 hour period with no measurable rainfall, and influent levels are at normal base flows.

After the permittee has collected a wet weather sample and a dry weather sample, the permittee may request from DEQ a waiver for the second wet weather sample. Documentation shall be submitted with the request to demonstrate why another wet weather sample is not necessary for the TMDL development. DEQ shall review the documentation and notify the permittee in writing on the final waiver decision.

3) Each effluent sample shall consist of a minimum 2 liter volume and be collected using either 24 hour manual or automated compositing methods. The sampling protocol shall be submitted to DEQ-NRO for review and approval prior to the first sample collection.

4) The data shall be submitted to DEQ-NRO by the 10th day of the month following receipt of the results. The permittee shall have the option of submitting the results electronically. The submittal shall include the unadjusted and appropriately qualified individual PCB congener analytical results. Additionally, laboratory and field QA/QC documentation and results shall be reported. Total PCBs are to be computed as the summation of the reported, quantified congeners.

l. TMDL Reopener. This special condition is to allow the permit to be reopened if necessary to bring it into compliance with any applicable TMDL that may be developed and approved for the receiving stream.

22. Permit Section Part II. Part II of the permit contains standard conditions that appear in all VPDES Permits. In general, these standard conditions address the responsibilities of the permittee, reporting requirements, testing procedures and records retention.

23. Changes to the Permit from the Previously Issued Permit:

a. Special Conditions:
   1) A PCB Monitoring Special Condition has been added.

b. Monitoring and Effluent Limitations:
   1) The 0.75 MGD, 2.0 MGD, and 2.5 MGD flow tiers have been removed from this permit.
   2) The wet weather flow limits have been removed from this permit.
   3) The total recoverable copper limit has been changed from 10 µg/L to 9.6 µg/L.
   4) A total recoverable zinc limit of 87 and a compliance schedule has been added.
   5) Orthophosphate monitoring has been removed.
   6) Loading limits for TKN have been placed in the permit.
   7) Loading limits for $cBOD_5$ and TSS have been rounded to two significant digits.
   8) The monitoring frequency for TKN has been increased from 1/2W to 5D/W.
   9) Monitoring for TRC after the chlorine contact tank has been removed since UV disinfection is now being used. However, seasonal TRC monitoring is included in this permit because chlorine is used on the clarifier wiers.
   10) The monitoring frequency for nitrate+nitrite as nitrogen, total nitrogen, and total phosphorus has been increased from 1/2 W to weekly.
   11) Total hardness monitoring has been added.

c. Other:
   1) Due to recalculation of the Outfall 001 drainage area, there have been changes in the receiving waters flow information.

24. Variances/Alternate Limits or Conditions: None

25. Public Notice Information:

First Public Notice Date: 6/30/2011 Second Public Notice Date: 7/7/2011

Public Notice Information is required by 9VAC25-31-280 B. All pertinent information is on file and may be inspected and copied by contacting the: DEQ Northern Regional Office, 13901 Crown Court, Woodbridge, VA 22193, telephone No. (703) 583-3837, anna.westernik@deq.virginia.gov. See **Attachment 12** for a copy of the public notice document.

Persons may comment in writing or by email to the DEQ on the proposed permit action, and may request a public hearing, during

the comment period. Comments shall include the name, address, and telephone number of the writer and of all persons represented by the commenter/requester, and shall contain a complete, concise statement of the factual basis for comments. Only those comments received within this period will be considered. The DEQ may decide to hold a public hearing, including another comment period, if public response is significant and there are substantial, disputed issues relevant to the permit. Requests for public hearings shall state 1) the reason why a hearing is requested; 2) a brief, informal statement regarding the nature and extent of the interest of the requester or of those represented by the requester, including how and to what extent such interest would be directly and adversely affected by the permit; and 3) specific references, where possible, to terms and conditions of the permit with suggested revisions. Following the comment period, the Board will make a determination regarding the proposed permit action. This determination will become effective, unless the DEQ grants a public hearing. Due notice of any public hearing will be given. The public may request an electronic copy of the draft permit and fact sheet or review the draft permit and application at the DEQ Northern Regional Office by appointment.

26. 303 (d) Listed Stream Segments and Total Max. Daily Loads (TMDL):

This facility discharges to Segment VAN-E13R_RAP01A00 of the Rapidan River. This segment of the Rapidan River is listed as not meeting the recreation use goal. Sufficient excursions from the maximum *E. coli* bacteria criterion (12 of 33 samples - 36.4%) were recorded at DEQ's ambient water quality monitoring station (3-RAP045.08) at the Route 15 crossing to assess this stream segment as not supporting of the recreation use goal for the 2010 water quality assessment

The Rapidan River Bacteria TMDL, approved by EPA on December 5, 2007, contains an *E. coli* wasteload allocation of 5.22E+12 cfu/year for the Town of Orange WWTP. The permit limit of 126 n/100 mL for *E. coli* will ensure that this allocation is met.

27. Additional Comments:

Previous Board Action(s):	The State Water Control Board issued a consent order to the Town of Orange on October 3, 2005. The requirements of the consent order are outlined in Appendix A, Schedule of Compliance accompanying this Order (see **Attachment 13**). This order is still currently open.
Staff Comments:	None.
Public Comment:	No comments were received during the public notice period.
EPA Checklist:	The checklist can be found **in Attachment 14**.

List of Attachments

Attachment 1	Flow Frequency Information
Attachment 2	Facility Schematic/Diagram
Attachment 3	USGS Topographic Map 185C (Madison Mills Quadrangle)
Attachment 4	Site Inspection Memorandum
Attachment 5	Planning Statement
Attachment 6	Commonwealth of Virginia Freshwater Water Quality Criteria and Wasteload Allocations
Attachment 7	90^{th} Percentile Calculations for pH and Temperature
Attachment 8	Summary of Effluent Data
Attachment 9	Derivation of Toxic Pollutant Limits
Attachment 10	Stream Modeling Conducted February 2011
Attachment 11	TMP Chronic Endpoint Determination
Attachment 12	Public Notice
Attachment 13	Appendix A, Schedule of Compliance, for the Town of Orange WWTP Consent Order Dated October 3, 2005
Attachment 14	EPA Checklist

Flows at Gauging Station 01665500 -- Rapidan River near Ruckersville, VA
Revised February 10, 2011

Flow Value	CFS	MGD
1Q30	1.4	0.904820
1Q10	3.1	2.003530
HF1Q10	17	10.987100
7Q10	4	2.585200
HF7Q10	21	13.572300
30Q10	7	4.524100
HF30Q10	29	18.742700
Harmonic Mean	44	28.437200
30Q5	10	6.463000

Flow Value CFS MGD cfs x 0.6463 = MGD

High Flow Months are December through June

Period Used to Determine 1Q10, 7Q10, 30Q10 Flows: 1942-1995, 1999-2006
Period Used to Determine Other Flows: 1942-1995, 1999-2003
Drainage Area at the Gauging Station = 114 mi^2

This continuous record gauge has been in operation since 1942. It is approximately 16.0 miles upstream of the Outfall 001 discharge point.

Drainage Area at the Rapidan River Outfall 001 Discharge Point = 233 mi^2
The flow values for the discharge point in the table below are determined by drainage area discharges, or springs are not addressed.
(DA Outfall/DA Gauge)Q at Gauge = Flow at Outfall

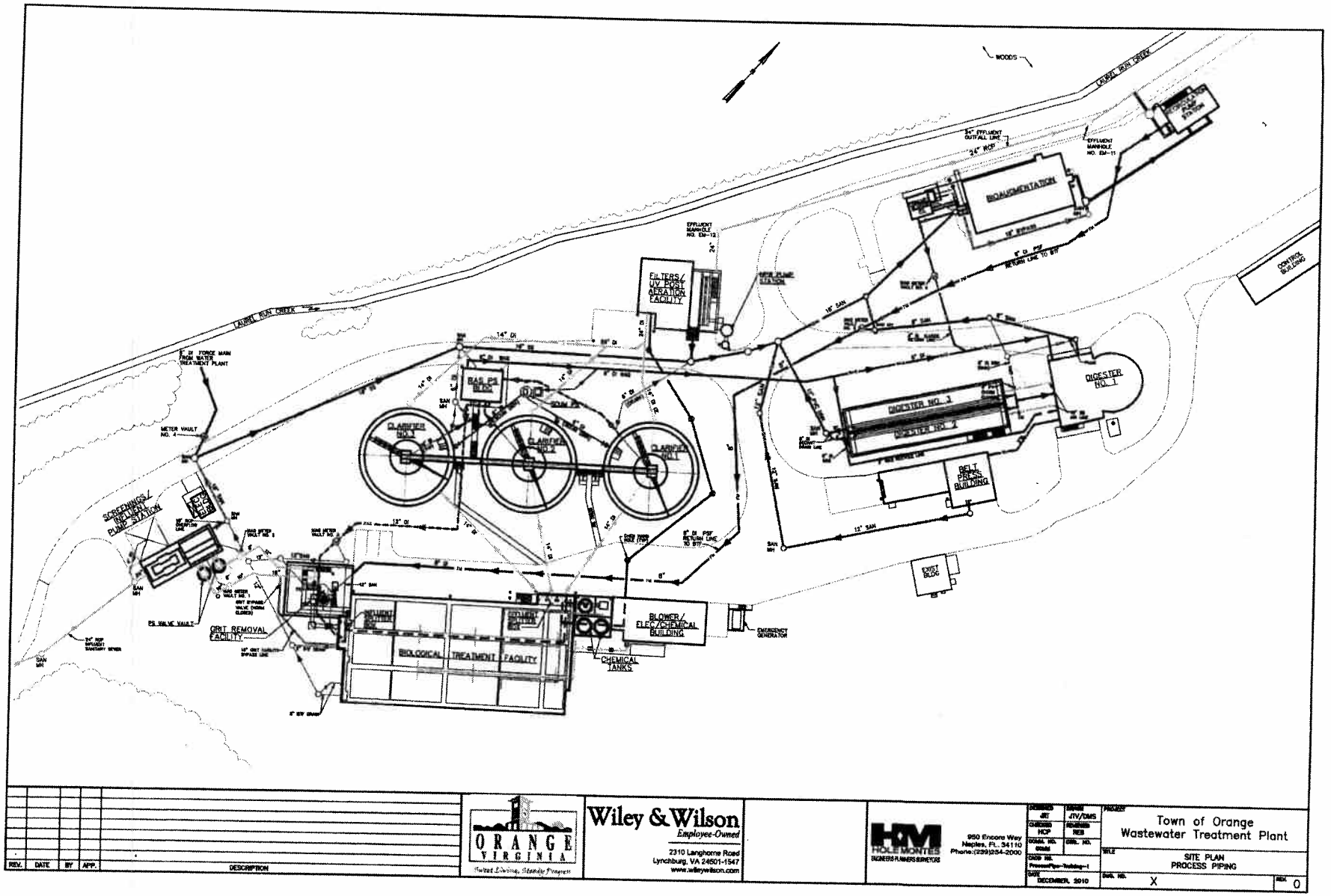
Flow Value	MGD
1Q30	1.849325
1Q10	4.094934
HF1Q10	22.456090
7Q10	5.283786
HF7Q10	27.739876
30Q10	9.246625
HF30Q10	38.307448
Harmonic Mean	58.121646
30Q5	13.209465

The withdrawal for the Town of Orange WTP is directly upstream of Outfall 001. In order to obtain accurate flow data, the volume of water withdrawn from the Rapidan River by the WTP must be subtracted from the flow frequencies calculated at the discharge point.

Attachment 1

The following are flows at the Outfall 001 Discharge Point after subtracting the maximum volume (2.6 MGD) of the Town of Orange WTP withdrawal allowed per DEQ VWP Permit No. 02-1835.

Flow Value	MGD
1Q30	-0.750675
1Q10	1.494934
HF1Q10	19.856090
7Q10	2.683786
HF7Q10	25.139876
30Q10	6.646625
HF30Q10	35.707448
Harmonic Mean	55.521646
30Q5	10.609465



REV.	DATE	BY	APP.	DESCRIPTION

ORANGE VIRGINIA
Sweet Living, Steady Progress

Wiley & Wilson
Employee-Owned
2310 Langhorne Road
Lynchburg, VA 24501-1547
www.wileywilson.com

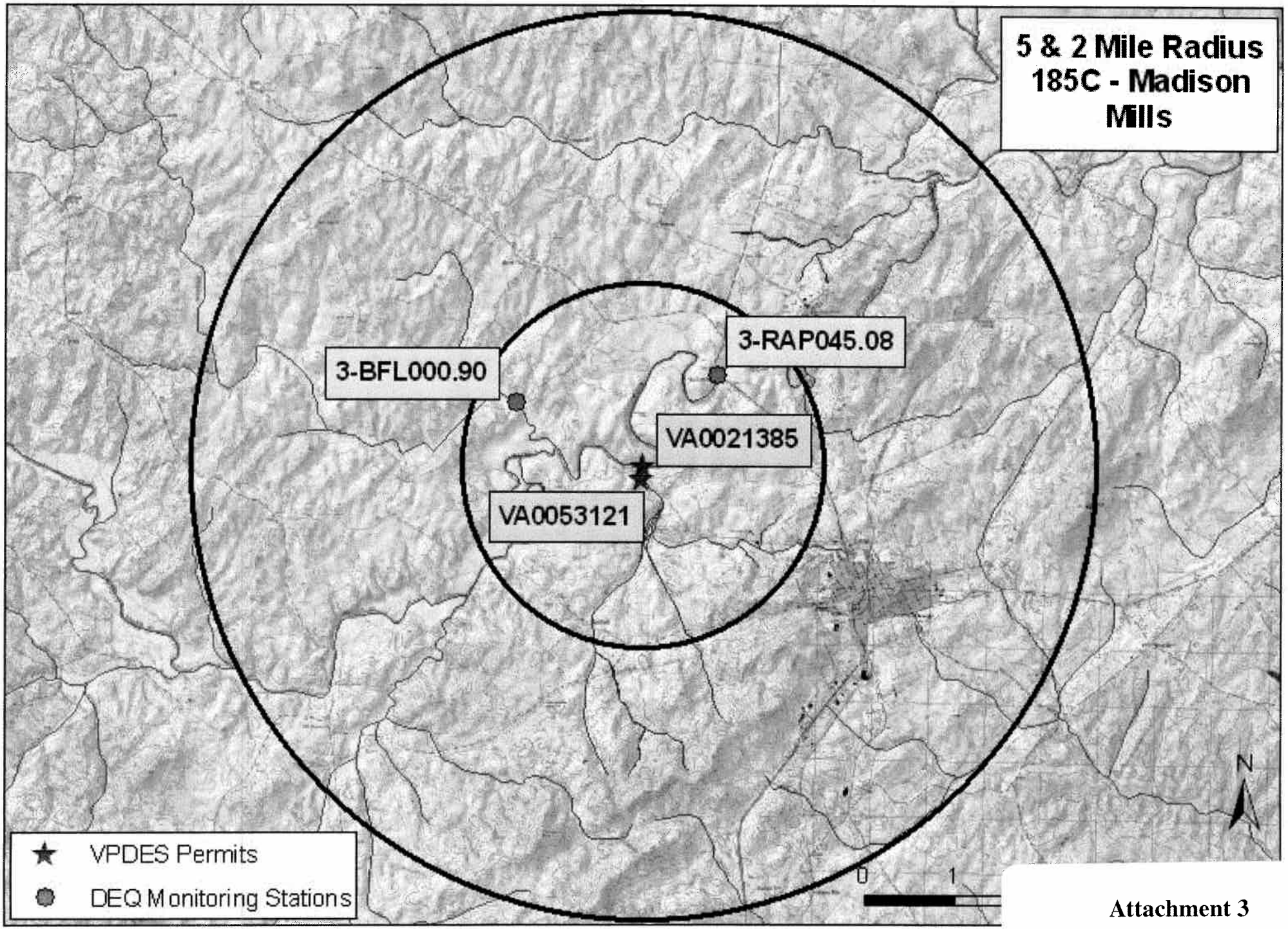
HOLE MONTES
BUSINESS PLANNERS SURVEYORS
950 Encore Way
Naples, FL. 34110
Phone:(239)254-2000

DESIGNED JRT	DRAWN JTV/DMS
CHECKED HCP	REVIEWED NEB
ORIGINAL NO. 00000	ORIG. NO.
CADD NO. Process\Pipe-Training-1	
DATE DECEMBER, 2010	

PROJECT: Town of Orange Wastewater Treatment Plant
TITLE: SITE PLAN PROCESS PIPING
DWG. NO. X
REV. 0

H:\2006\20060087\NOW\1-for Training\DWG\Process\Pipe-Training-1.dwg, 12/14/2010 9:42:21 AM, Adobe PDF

Attachment 2



Attachment 3

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

MEMORANDUM

Northern Regional Office

TO: File

FROM: Anna Westernik, Water Permit Writer

DATE: January 6, 2011

SUBJECT: December 7, 2010 CTO Site Visit to the Town of Orange WWTP

On December 7, 2010, a Conditional CTO was issued for the 3.0 MGD Town of Orange WWTP. The design of the facility includes Enhanced Nutrient Removal (ENR) technology to achieve annual average discharge concentrations of 0.30 mg/L Total Phosphorus and 4.0 mg/L Total Nitrogen.

The following is a summary and description of the expanded plant with ENR capability.

Primary Treatment- Two mechanical bar screens operating in parallel remove large debris prior to grit removal.

The existing primary clarifier has remained in service to promote hydrolysis and acid fermentation. This will increase volatile fatty acids entering the downstream anoxic zones, enhancing nutrient removal.

The existing secondary clarifier has been converted to function as a primary clarifier and an equalization basin. Provisions are made to recycle sludge through the primary clarifiers for the elutriation of these compounds. Additionally, septage, water treatment plant sludge, plant drains, filter backwash, filtrate from the belt filter press, and decant from aerobic sludge digesters are received at this location. Transfer pumps convey this sidestream to the main activated sludge process.

Secondary Treatment - The biological process is the 4-stage Bardenpho System (a single sludge suspended growth process). The unit has a total volume of 1.5 MG based on an annual average daily flow of 3.0 MGD. The anticipated BOD load will be 4,620 lb/day or 38.5 lb/d/1000 ft^3 based on 0.90 MG in the nitrification and re-aeration basins.

Three basins are provided with room to add one future basin. The nitrification basin in each train is divided into two compartments. Because the waste strength is higher in the first basin, more air will be required in the upstream basin. Analysis shows that more than 50% of the BOD and 90% of the TKN is oxidized in the first chamber with an air flow requirement 50% higher in the first basin than the second. Coarse bubble diffusers are specified to insure adequate mixing during low loading periods when lower air flow rates will be necessary. Pumping is provided for return mixed liquor recycle flow for each train.

The volume of the second anoxic chamber was set equal to the volume of the first anoxic zone. Because denitrification rates for endogenous respiration are much lower in the second anoxic basin, an additional carbon source (e.g., methanol added at the head of the second anoxic zone) may need to be added during cold weather and has been included in the design. Additionally, each basin will be provided with three floating or submersible

mixers in the anoxic zone. Magnesium hydroxide may be added for pH control at the influent splitter box.

Secondary Clarification - Three 68-foot diameter circular clarifiers are present after secondary treatment. Room is available onsite for an additional unit in the future. Pumping is provided for return activated sludge at each secondary clarifier pump station. Alum or ferric chloride is added prior to secondary clarification to assist in the removal of phosphorus or to aid in sedimentation, filtration, and dewatering of residuals. Sodium hypochlorite is added to the wiers of the clarifiers during May through September to control algal growth.

Solids handling - Solids are thickened prior to digestion with the use of polymer. Digestion of sludge occurs in three aerobic digesters with a total volume of 0.69 MG. Dewatering of digested biological solids prior to offsite disposal is achieved by a one-meter belt filter press. At full loading and flow, approximately 3,300 lb of 15% solids cake will be produced. The press will dewater 3,400 lb/day of digested sludge. Sludge disposal is at the Orange County Landfill.

Effluent Filtration – Tertiary effluent filtration is achieved utilizing two cloth media filter units operated in parallel. Each filter unit has twelve disks totaling 646 ft^2 of filtration surface area per filter, which results in a total of 1,292 ft^2 of filtration area. The woven cloth media has a nominal pore opening of 10 microns that is capable of producing a low TSS effluent under a wide range of loading conditions. Under average flow conditions, the hydraulic loading rate will be approximately 1.6 gpm/ft^2 at 3.0 MGD. At peak flow conditions, the hydraulic loading rate will be approximately 4.3 gpm/ft^2 at 8.0 MGD. The filter system is fed via gravity flow.

Disinfection and Final Discharge – Disinfection is achieved through the use of two UV filter banks operating in parallel. After disinfection, the effluent flows through a Parshall Flume where it is metered and a 12-step cascade aerator. Discharge is to the Rapidan River through a 24-inch shore-based outfall approximately 500 feet downstream of a coffer dam.

The receiving stream in the discharge area is approximately 80' wide. The stream was clear upstream and downstream of the discharge on this date. Numerous storm water outfalls have been constructed on the treatment plant property in conjunction with the upgrade. They discharge to Laurel Run and Poplar Run.

To: Anna Westernik
From: Jennifer Carlson
Date: January 21, 2011
Subject: Planning Statement for the Town of Orange WWTP
Permit No: VA0021385

Discharge Type: Municipal/Industrial
Discharge Flow: 3.0 MGD Municipal (Outfall 001)
Receiving Stream: Rapidan River
Latitude / Longitude: 38°15'56" / 78°09'21"(Outfall 001);
Streamcode: 3-RAP
Waterbody: E13R/RA30
WQ Stds: Class III, Sec. 4
Rivermile: 48.13

1. Is there monitoring data for the receiving stream? Yes.
   - If yes, please attach latest summary.

   Segment VAN-E13R_RAP01A00 of the Rapidan River is the receiving stream. This segment begins at the confluence with Poplar Run and continues downstream until the confluence with the Robinson River. The nearest downstream monitoring station is 3-RAP045.08, which is located approximately 3 miles downstream of Outfall 001, at the Rt. 15 bridge crossing. The following is a summary for this segment of the Rapidan River, as taken from the 2010 Draft Integrated Report:

   Class III, Section 4.

   DEQ ambient monitoring station 3-RAP045.08, at Route 15.

   E. coli monitoring finds a bacterial impairment, resulting in an impaired classification for the recreation use. The aquatic life and wildlife uses are considered fully supporting. The fish consumption use was not assessed.

   - If no, where is the nearest downstream monitoring station.

2. Is the receiving stream on the current 303(d) list? Yes.

   - If yes, what is the impairment?

   This segment of the Rapidan River is listed as not meeting the recreation use goal. Sufficient excursions from the maximum *E. coli* bacteria criterion (12 of 33 samples - 36.4%) were recorded at DEQ's ambient water quality monitoring station (3-RAP045.08) at the Route 15 crossing to assess this stream segment as not supporting of the recreation use goal for the 2010 water quality assessment.

Attachment 5

- Has the TMDL been prepared?

Yes, the Rapidan River Bacteria TMDL has been completed.

- If yes, what is the WLA for the discharge?

The WLA for this facility is 5.22E+12 cfu/year of *E. coli* bacteria.

- If no, what is the schedule for the TMDL?

The Rapidan River Bacteria TMDL was completed and approved by EPA on 12/05/2007.

3. If the answer to (2) above is no, is there a downstream 303(d) listed impairment? N/A

   - If yes, what is the impairment? N/A

   - Has a TMDL been prepared? N/A

   - Will the TMDL include the receiving stream? N/A

   - Is there a WLA for the discharge? N/A

   - What is the schedule for the TMDL? N/A

4. Is there monitoring or other conditions that Planning/Assessment needs in the permit?

   In preparation for the PCB TMDL that will be developed for the tidal Rappahannock River by 2016, the Assessment/TMDL Staff recommend that this facility perform low-level PCB monitoring during the upcoming permit cycle. TMDL Guidance Memo No. 09-2001 recommends that major municipal VPDES facilities collect 2 wet and 2 dry samples during the permit cycle, using EPA Method 1668B, which is capable of detecting low-level concentrations for all 209 PCB congeners.

5. Could you please calculate the drainage area at the outfall?

   The drainage area at Outfall 001 is 233 mi^2.

6. Fact Sheet Requirements – Please provide information on other individual VPDES permits or VA DEQ monitoring stations located within a 2 mile radius of the facility. In addition, please provide information on any drinking water intakes located within a 5 mile radius of the facility.

   The Town of Orange public water supply intake is located upstream of this facility within a 5 mile radius. There is one other VDPES permit within a 2 mile radius of this facility, VA0053121, Town of Orange WTP. Additionally, there are 2 DEQ water quality monitoring stations, 3-BFL000.90 and 3-RAP045.08, within the 2 mile radius.

FRESHWATER
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Attachment 6

Facility Name: The Town of Orange WWTP Permit No.: VA0021385

Receiving Stream: Rapidan River Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information

Mean Hardness (as CaCO3) =	25 mg/L
90% Temperature (Annual) =	25.61 deg C
90% Temperature (Wet season) =	24.6 deg C
90% Maximum pH =	7.6 SU
10% Maximum pH =	7.1 SU
Tier Designation (1 or 2) =	1
Public Water Supply (PWS) Y/N? =	n
Trout Present Y/N? =	n
Early Life Stages Present Y/N? =	y

Stream Flows

1Q10 (Annual) =	1.5 MGD
7Q10 (Annual) =	2.7 MGD
30Q10 (Annual) =	6.6 MGD
1Q10 (Wet season) =	20 MGD
30Q10 (Wet season)	36 MGD
30Q5 =	11 MGD
Harmonic Mean =	55 MGD

Mixing Information

Annual - 1Q10 Mix =	7.52 %
- 7Q10 Mix =	100 %
- 30Q10 Mix =	100 %
Wet Season - 1Q10 Mix =	32.83 %
- 30Q10 Mix =	100 %

Effluent Information

Mean Hardness (as CaCO3) =	69 mg/L
90% Temp (Annual) =	25 deg C
90% Temp (Wet season) =	15 deg C
90% Maximum pH =	8.1 SU
10% Maximum pH =	6.1 SU
Discharge Flow =	3 MGD

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Acenapthene	0	--	--	na	9.9E+02	--	--	na	4.6E+03	--	--	--	--	--	--	--	--	--	--	na	4.6E+03
Acrolein	0	--	--	na	9.3E+00	--	--	na	4.3E+01	--	--	--	--	--	--	--	--	--	--	na	4.3E+01
Acrylonitrile [C]	0	--	--	na	2.5E+00	--	--	na	4.8E+01	--	--	--	--	--	--	--	--	--	--	na	4.8E+01
Aldrin [C]	0	3.0E+00	--	na	5.0E-04	3.1E+00	--	na	9.7E-03	--	--	--	--	--	--	--	--	3.1E+00	--	na	9.7E-03
Ammonia-N (mg/l) (Yearly)	0	7.40E+00	1.76E+00	na	--	7.7E+00	5.6E+00	na	--	--	--	--	--	--	--	--	--	7.7E+00	5.6E+00	na	--
Ammonia-N (mg/l) (High Flow)	0	1.43E+01	2.13E+00	na	--	4.6E+01	2.8E+01	na	--	--	--	--	--	--	--	--	--	4.6E+01	2.8E+01	na	--
Anthracene	0	--	--	na	4.0E+04	--	--	na	1.9E+05	--	--	--	--	--	--	--	--	--	--	na	1.9E+05
Antimony	0	--	--	na	6.4E+02	--	--	na	3.0E+03	--	--	--	--	--	--	--	--	--	--	na	3.0E+03
Arsenic	0	3.4E+02	1.5E+02	na	--	3.5E+02	2.9E+02	na	--	--	--	--	--	--	--	--	--	3.5E+02	2.9E+02	na	--
Barium	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Benzene [C]	0	--	--	na	5.1E+02	--	--	na	9.9E+03	--	--	--	--	--	--	--	--	--	--	na	9.9E+03
Benzidine [C]	0	--	--	na	2.0E-03	--	--	na	3.9E-02	--	--	--	--	--	--	--	--	--	--	na	3.9E-02
Benzo (a) anthracene [C]	0	--	--	na	1.8E-01	--	--	na	3.5E+00	--	--	--	--	--	--	--	--	--	--	na	3.5E+00
Benzo (b) fluoranthene [C]	0	--	--	na	1.8E-01	--	--	na	3.5E+00	--	--	--	--	--	--	--	--	--	--	na	3.5E+00
Benzo (k) fluoranthene [C]	0	--	--	na	1.8E-01	--	--	na	3.5E+00	--	--	--	--	--	--	--	--	--	--	na	3.5E+00
Benzo (a) pyrene [C]	0	--	--	na	1.8E-01	--	--	na	3.5E+00	--	--	--	--	--	--	--	--	--	--	na	3.5E+00
Bis2-Chloroethyl Ether [C]	0	--	--	na	5.3E+00	--	--	na	1.0E+02	--	--	--	--	--	--	--	--	--	--	na	1.0E+02
Bis2-Chloroisopropyl Ether	0	--	--	na	6.5E+04	--	--	na	3.0E+05	--	--	--	--	--	--	--	--	--	--	na	3.0E+05
Bis 2-Ethylhexyl Phthalate [C]	0	--	--	na	2.2E+01	--	--	na	4.3E+02	--	--	--	--	--	--	--	--	--	--	na	4.3E+02
Bromoform [C]	0	--	--	na	1.4E+03	--	--	na	2.7E+04	--	--	--	--	--	--	--	--	--	--	na	2.7E+04
Butylbenzylphthalate	0	--	--	na	1.9E+03	--	--	na	8.9E+03	--	--	--	--	--	--	--	--	--	--	na	8.9E+03
Cadmium	0	2.5E+00	6.4E-01	na	--	2.6E+00	1.2E+00	na	--	--	--	--	--	--	--	--	--	2.6E+00	1.2E+00	na	--
Carbon Tetrachloride [C]	0	--	--	na	1.6E+01	--	--	na	3.1E+02	--	--	--	--	--	--	--	--	--	--	na	3.1E+02
Chlordane [C]	0	2.4E+00	4.3E-03	na	8.1E-03	2.5E+00	8.2E-03	na	1.6E-01	--	--	--	--	--	--	--	--	2.5E+00	8.2E-03	na	1.6E-01
Chloride	0	8.6E+05	2.3E+05	na	--	8.9E+05	4.4E+05	na	--	--	--	--	--	--	--	--	--	8.9E+05	4.4E+05	na	--
TRC	0	1.9E+01	1.1E+01	na	--	2.0E+01	2.1E+01	na	--	--	--	--	--	--	--	--	--	2.0E+01	2.1E+01	na	--
Chlorobenzene	0	--	--	na	1.6E+03	--	--	na	7.5E+03	--	--	--	--	--	--	--	--	--	--	na	7.5E+03

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Chlorodibromomethane[C]	0	--	--	na	1.3E+02	--	--	na	2.5E+03	--	--	--	--	--	--	--	--	--	--	na	2.5E+03
Chloroform	0	--	--	na	1.1E+04	--	--	na	5.1E+04	--	--	--	--	--	--	--	--	--	--	na	5.1E+04
2-Chloronaphthalene	0	--	--	na	1.6E+03	--	--	na	7.5E+03	--	--	--	--	--	--	--	--	--	--	na	7.5E+03
2-Chlorophenol	0	--	--	na	1.5E+02	--	--	na	7.0E+02	--	--	--	--	--	--	--	--	--	--	na	7.0E+02
Chlorpyrifos	0	8.3E-02	4.1E-02	na	--	8.6E-02	7.8E-02	na	--	--	--	--	--	--	--	--	--	8.6E-02	7.8E-02	na	--
Chromium III	0	4.1E+02	4.1E+01	na	--	4.3E+02	7.7E+01	na	--	--	--	--	--	--	--	--	--	4.3E+02	7.7E+01	na	--
Chromium VI	0	1.6E+01	1.1E+01	na	--	1.7E+01	2.1E+01	na	--	--	--	--	--	--	--	--	--	1.7E+01	2.1E+01	na	--
Chromium, Total	0	--	--	1.0E+02	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Chrysene[C]	0	--	--	na	1.8E-02	--	--	na	3.5E-01	--	--	--	--	--	--	--	--	--	--	na	3.5E-01
Copper	0	9.3E+00	4.8E+00	na	--	9.6E+00	9.1E+00	na	--	--	--	--	--	--	--	--	--	9.6E+00	9.1E+00	na	--
Cyanide, Free	0	2.2E+01	5.2E+00	na	1.6E+04	2.3E+01	9.9E+00	na	7.5E+04	--	--	--	--	--	--	--	--	2.3E+01	9.9E+00	na	7.5E+04
DDD[C]	0	--	--	na	3.1E-03	--	--	na	6.0E-02	--	--	--	--	--	--	--	--	--	--	na	6.0E-02
DDE[C]	0	--	--	na	2.2E-03	--	--	na	4.3E-02	--	--	--	--	--	--	--	--	--	--	na	4.3E-02
DDT[C]	0	1.1E+00	1.0E-03	na	2.2E-03	1.1E+00	1.9E-03	na	4.3E-02	--	--	--	--	--	--	--	--	1.1E+00	1.9E-03	na	4.3E-02
Demeton	0	--	1.0E-01	na	--	--	1.9E-01	na	--	--	--	--	--	--	--	--	--	--	1.9E-01	na	--
Diazinon	0	1.7E-01	1.7E-01	na	--	1.8E-01	3.2E-01	na	--	--	--	--	--	--	--	--	--	1.8E-01	3.2E-01	na	--
Dibenz(a,h)anthracene[C]	0	--	--	na	1.8E-01	--	--	na	3.5E+00	--	--	--	--	--	--	--	--	--	--	na	3.5E+00
1,2-Dichlorobenzene	0	--	--	na	1.3E+03	--	--	na	6.1E+03	--	--	--	--	--	--	--	--	--	--	na	6.1E+03
1,3-Dichlorobenzene	0	--	--	na	9.6E+02	--	--	na	4.5E+03	--	--	--	--	--	--	--	--	--	--	na	4.5E+03
1,4-Dichlorobenzene	0	--	--	na	1.9E+02	--	--	na	8.9E+02	--	--	--	--	--	--	--	--	--	--	na	8.9E+02
3,3-Dichlorobenzidine[C]	0	--	--	na	2.8E-01	--	--	na	5.4E+00	--	--	--	--	--	--	--	--	--	--	na	5.4E+00
Dichlorobromomethane[C]	0	--	--	na	1.7E+02	--	--	na	3.3E+03	--	--	--	--	--	--	--	--	--	--	na	3.3E+03
1,2-Dichloroethane[C]	0	--	--	na	3.7E+02	--	--	na	7.2E+03	--	--	--	--	--	--	--	--	--	--	na	7.2E+03
1,1-Dichloroethylene	0	--	--	na	7.1E+03	--	--	na	3.3E+04	--	--	--	--	--	--	--	--	--	--	na	3.3E+04
1,2-trans-dichloroethylene	0	--	--	na	1.0E+04	--	--	na	4.7E+04	--	--	--	--	--	--	--	--	--	--	na	4.7E+04
2,4-Dichlorophenol	0	--	--	na	2.9E+02	--	--	na	1.4E+03	--	--	--	--	--	--	--	--	--	--	na	1.4E+03
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
1,2-Dichloropropane[C]	0	--	--	na	1.5E+02	--	--	na	2.9E+03	--	--	--	--	--	--	--	--	--	--	na	2.9E+03
1,3-Dichloropropene[C]	0	--	--	na	2.1E+02	--	--	na	4.1E+03	--	--	--	--	--	--	--	--	--	--	na	4.1E+03
Dieldrin[C]	0	2.4E-01	5.6E-02	na	5.4E-04	2.5E-01	1.1E-01	na	1.0E-02	--	--	--	--	--	--	--	--	2.5E-01	1.1E-01	na	1.0E-02
Diethyl Phthalate	0	--	--	na	4.4E+04	--	--	na	2.1E+05	--	--	--	--	--	--	--	--	--	--	na	2.1E+05
2,4-Dimethylphenol	0	--	--	na	8.5E+02	--	--	na	4.0E+03	--	--	--	--	--	--	--	--	--	--	na	4.0E+03
Dimethyl Phthalate	0	--	--	na	1.1E+06	--	--	na	5.1E+06	--	--	--	--	--	--	--	--	--	--	na	5.1E+06
Di-n-Butyl Phthalate	0	--	--	na	4.5E+03	--	--	na	2.1E+04	--	--	--	--	--	--	--	--	--	--	na	2.1E+04
2,4 Dinitrophenol	0	--	--	na	5.3E+03	--	--	na	2.5E+04	--	--	--	--	--	--	--	--	--	--	na	2.5E+04
2-Methyl-4,6-Dinitrophenol	0	--	--	na	2.8E+02	--	--	na	1.3E+03	--	--	--	--	--	--	--	--	--	--	na	1.3E+03
2,4-Dinitrotoluene[C]	0	--	--	na	3.4E+01	--	--	na	6.6E+02	--	--	--	--	--	--	--	--	--	--	na	6.6E+02
Dioxin 2,3,7,8-tetrachlorodibenzo-p-dioxin	0	--	--	na	5.1E-08	--	--	na	2.4E-07	--	--	--	--	--	--	--	--	--	--	na	2.4E-07
1,2-Diphenylhydrazine[C]	0	--	--	na	2.0E+00	--	--	na	3.9E+01	--	--	--	--	--	--	--	--	--	--	na	3.9E+01
Alpha-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	2.3E-01	1.1E-01	na	4.2E+02	--	--	--	--	--	--	--	--	2.3E-01	1.1E-01	na	4.2E+02
Beta-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	2.3E-01	1.1E-01	na	4.2E+02	--	--	--	--	--	--	--	--	2.3E-01	1.1E-01	na	4.2E+02
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	2.3E-01	1.1E-01	--	--	--	--	--	--	--	--	--	--	2.3E-01	1.1E-01	--	--
Endosulfan Sulfate	0	--	--	na	8.9E+01	--	--	na	4.2E+02	--	--	--	--	--	--	--	--	--	--	na	4.2E+02
Endrin	0	8.6E-02	3.6E-02	na	6.0E-02	8.9E-02	6.8E-02	na	2.8E-01	--	--	--	--	--	--	--	--	8.9E-02	6.8E-02	na	2.8E-01
Endrin Aldehyde	0	--	--	na	3.0E-01	--	--	na	1.4E+00	--	--	--	--	--	--	--	--	--	--	na	1.4E+00

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Ethylbenzene	0	--	--	na	2.1E+03	--	--	na	9.8E+03	--	--	--	--	--	--	--	--	--	--	**na**	**9.8E+03**
Fluoranthene	0	--	--	na	1.4E+02	--	--	na	6.5E+02	--	--	--	--	--	--	--	--	--	--	na	**6.5E+02**
Fluorene	0	--	--	na	5.3E+03	--	--	na	2.5E+04	--	--	--	--	--	--	--	--	--	--	na	**2.5E+04**
Foaming Agents	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	**na**	--
Guthion	0	--	1.0E-02	na	--	--	1.9E-02	na	--	--	--	--	--	--	--	--	--	--	**1.9E-02**	na	--
Heptachlor [C]	0	5.2E-01	3.8E-03	na	7.9E-04	5.4E-01	7.2E-03	na	1.5E-02	--	--	--	--	--	--	--	--	**5.4E-01**	**7.2E-03**	**na**	**1.5E-02**
Heptachlor Epoxide[C]	0	5.2E-01	3.8E-03	na	3.9E-04	5.4E-01	7.2E-03	na	7.5E-03	--	--	--	--	--	--	--	--	**5.4E-01**	**7.2E-03**	**na**	**7.5E-03**
Hexachlorobenzene[C]	0	--	--	na	2.9E-03	--	--	na	5.6E-02	--	--	--	--	--	--	--	--	--	--	na	**5.6E-02**
Hexachlorobutadiene[C]	0	--	--	na	1.8E+02	--	--	na	3.5E+03	--	--	--	--	--	--	--	--	--	--	na	**3.5E+03**
Hexachlorocyclohexane Alpha-BHC[C]	0	--	--	na	4.9E-02	--	--	na	9.5E-01	--	--	--	--	--	--	--	--	--	--	**na**	**9.5E-01**
Hexachlorocyclohexane Beta-BHC[C]	0	--	--	na	1.7E-01	--	--	na	3.3E+00	--	--	--	--	--	--	--	--	--	--	**na**	**3.3E+00**
Hexachlorocyclohexane Gamma-BHC[C] (Lindane)	0	9.5E-01	na	na	1.8E+00	9.9E-01	--	na	3.5E+01	--	--	--	--	--	--	--	--	**9.9E-01**	--	na	**3.5E+01**
Hexachlorocyclopentadiene	0	--	--	na	1.1E+03	--	--	na	5.1E+03	--	--	--	--	--	--	--	--	--	--	**na**	**5.1E+03**
Hexachloroethane[C]	0	--	--	na	3.3E+01	--	--	na	6.4E+02	--	--	--	--	--	--	--	--	--	--	**na**	**6.4E+02**
Hydrogen Sulfide	0	--	2.0E+00	na	--	--	3.8E+00	na	--	--	--	--	--	--	--	--	--	--	**3.8E+00**	na	--
Indeno (1,2,3-cd) pyrene [C]	0	--	--	na	1.8E-01	--	--	na	3.5E+00	--	--	--	--	--	--	--	--	--	--	na	**3.5E+00**
Iron	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	**na**	--
Isophorone[C]	0	--	--	na	9.6E+03	--	--	na	1.9E+05	--	--	--	--	--	--	--	--	--	--	na	**1.9E+05**
Kepone	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	--	**0.0E+00**	na	--
Lead	0	7.2E+01	5.3E+00	na	--	7.5E+01	1.0E+01	na	--	--	--	--	--	--	--	--	--	**7.5E+01**	**1.0E+01**	**na**	--
Malathion	0	--	1.0E-01	na	--	--	1.9E-01	na	--	--	--	--	--	--	--	--	--	--	**1.9E-01**	na	--
Manganese	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Mercury	0	1.4E+00	7.7E-01	--	--	1.5E+00	1.5E+00	--	--	--	--	--	--	--	--	--	--	**1.5E+00**	**1.5E+00**	--	--
Methyl Bromide	0	--	--	na	1.5E+03	--	--	na	7.0E+03	--	--	--	--	--	--	--	--	--	--	na	**7.0E+03**
Methylene Chloride [C]	0	--	--	na	5.9E+03	--	--	na	1.1E+05	--	--	--	--	--	--	--	--	--	--	**na**	**1.1E+05**
Methoxychlor	0	--	3.0E-02	na	--	--	5.7E-02	na	--	--	--	--	--	--	--	--	--	--	**5.7E-02**	**na**	--
Mirex	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	--	**0.0E+00**	**na**	--
Nickel	0	1.3E+02	1.1E+01	na	4.6E+03	1.4E+02	2.1E+01	na	2.1E+04	--	--	--	--	--	--	--	--	**1.4E+02**	**2.1E+01**	na	**2.1E+04**
Nitrate (as N)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	**na**	--
Nitrobenzene	0	--	--	na	6.9E+02	--	--	na	3.2E+03	--	--	--	--	--	--	--	--	--	--	**na**	**3.2E+03**
N-Nitrosodimethylamine[C]	0	--	--	na	3.0E+01	--	--	na	5.8E+02	--	--	--	--	--	--	--	--	--	--	na	**5.8E+02**
N-Nitrosodiphenylamine[C]	0	--	--	na	6.0E+01	--	--	na	1.2E+03	--	--	--	--	--	--	--	--	--	--	na	**1.2E+03**
N-Nitrosodi-n-propylamine[C]	0	--	--	na	5.1E+00	--	--	na	9.9E+01	--	--	--	--	--	--	--	--	--	--	na	**9.9E+01**
Nonylphenol	0	2.8E+01	6.6E+00	--	--	2.9E+01	1.3E+01	na	--	--	--	--	--	--	--	--	--	**2.9E+01**	**1.3E+01**	**na**	--
Parathion	0	6.5E-02	1.3E-02	na	--	6.7E-02	2.5E-02	na	--	--	--	--	--	--	--	--	--	**6.7E-02**	**2.5E-02**	na	--
PCB Total[C]	0	--	1.4E-02	na	6.4E-04	--	2.7E-02	na	1.2E-02	--	--	--	--	--	--	--	--	--	**2.7E-02**	**na**	**1.2E-02**
Pentachlorophenol [C]	0	3.6E+00	3.5E+00	na	3.0E+01	3.7E+00	6.6E+00	na	5.8E+02	--	--	--	--	--	--	--	--	**3.7E+00**	**6.6E+00**	**na**	**5.8E+02**
Phenol	0	--	--	na	8.6E+05	--	--	na	4.0E+06	--	--	--	--	--	--	--	--	--	--	**na**	**4.0E+06**
Pyrene	0	--	--	na	4.0E+03	--	--	na	1.9E+04	--	--	--	--	--	--	--	--	--	--	**na**	**1.9E+04**
Radionuclides	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	**na**	--
Gross Alpha Activity (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	**na**	--
Beta and Photon Activity (mrem/yr)	0	--	--	na	4.0E+00	--	--	na	1.9E+01	--	--	--	--	--	--	--	--	--	--	na	**1.9E+01**
Radium 226 + 228 (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	**na**	--
Uranium (ug/l)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	na	4.2E+03	2.1E+01	9.5E+00	na	2.0E+04	--	--	--	--	--	--	--	--	**2.1E+01**	**9.5E+00**	**na**	**2.0E+04**
Silver	0	1.8E+00	--	na	--	1.8E+00	--	na	--	--	--	--	--	--	--	--	--	**1.8E+00**	**--**	**na**	**--**
Sulfate	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
1,1,2,2-Tetrachloroethane[C]	0	--	--	na	4.0E+01	--	--	na	7.7E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**7.7E+02**
Tetrachloroethylene[C]	0	--	--	na	3.3E+01	--	--	na	6.4E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**6.4E+02**
Thallium	0	--	--	na	4.7E-01	--	--	na	2.2E+00	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.2E+00**
Toluene	0	--	--	na	6.0E+03	--	--	na	2.8E+04	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**2.8E+04**
Total dissolved solids	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Toxaphene [C]	0	7.3E-01	2.0E-04	na	2.8E-03	7.6E-01	3.8E-04	na	5.4E-02	--	--	--	--	--	--	--	--	**7.6E-01**	**3.8E-04**	**na**	**5.4E-02**
Tributyltin	0	4.6E-01	7.2E-02	na	--	4.8E-01	1.4E-01	na	--	--	--	--	--	--	--	--	--	**4.8E-01**	**1.4E-01**	**na**	**--**
1,2,4-Trichlorobenzene	0	--	--	na	7.0E+01	--	--	na	3.3E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.3E+02**
1,1,2-Trichloroethane[C]	0	--	--	na	1.6E+02	--	--	na	3.1E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**3.1E+03**
Trichloroethylene [C]	0	--	--	na	3.0E+02	--	--	na	5.8E+03	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**5.8E+03**
2,4,6-Trichlorophenol [C]	0	--	--	na	2.4E+01	--	--	na	4.6E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.6E+02**
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**--**
Vinyl Chloride[C]	0	--	--	na	2.4E+01	--	--	na	4.6E+02	--	--	--	--	--	--	--	--	**--**	**--**	**na**	**4.6E+02**
Zinc	0	8.4E+01	6.4E+01	na	2.6E+04	8.7E+01	1.2E+02	na	1.2E+05	--	--	--	--	--	--	--	--	**8.7E+01**	**1.2E+02**	**na**	**1.2E+05**

Notes:

1. All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
2. Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipals
3. Metals measured as Dissolved, unless specified otherwise
4. "C" indicates a carcinogenic parameter
5. Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.
   Antidegradation WLAs are based upon a complete mix.
6. Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic
   = (0.1(WQC - background conc.) + background conc.) for human health
7. WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens and Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to (mixing ratio - 1), effluent flow equal to 1 and 100% mix.

Metal	Target Value (SSTV)
Antimony	3.0E+03
Arsenic	1.4E+02
Barium	na
Cadmium	7.3E-01
Chromium III	4.6E+01
Chromium VI	6.6E+00
Copper	3.8E+00
Iron	na
Lead	6.1E+00
Manganese	na
Mercury	5.8E-01
Nickel	1.2E+01
Selenium	5.7E+00
Silver	7.3E-01
Zinc	3.5E+01

Note: do not use QL's lower than the minimum QL's provided in agency guidance

Mixing Zone Predictions for The Town of Orange WWTP

Effluent Flow = 3.0 MGD
Stream 7Q10 = 2.7 MGD
Stream 30Q10 = 6.6 MGD
Stream 1Q10 = 1.5 MGD
Stream slope = 0.001 ft/ft
Stream width = 80 ft
Bottom scale = 4
Channel scale = 1

Mixing Zone Predictions @ 7Q10

Depth = .5147 ft
Length = 8280.88 ft
Velocity = .2143 ft/sec
Residence Time = .4472 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.

Mixing Zone Predictions @ 30Q10

Depth = .705 ft
Length = 6350.96 ft
Velocity = .2635 ft/sec
Residence Time = .279 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.

Mixing Zone Predictions @ 1Q10

Depth = .4463 ft
Length = 9335.71 ft
Velocity = .1951 ft/sec
Residence Time = 13.2917 hours

Recommendation:

A complete mix assumption is appropriate for this situation providing no more than 7.52% of the 1Q10 is used.

Mixing Zone Predictions for

Effluent Flow = 3 MGD
Stream 7Q10 = 25.1 MGD
Stream 30Q10 = 35.7 MGD
Stream 1Q10 = 19.85 MGD
Stream slope = .001 ft/ft
Stream width = 80 ft
Bottom scale = 4
Channel scale = 1

Mixing Zone Predictions @ 7Q10

Depth = 1.3513 ft
Length = 3654.23 ft
Velocity = .4024 ft/sec
Residence Time = .1051 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.

Mixing Zone Predictions @ 30Q10

Depth = 1.642 ft
Length = 3092.06 ft
Velocity = .456 ft/sec
Residence Time = .0785 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.

Mixing Zone Predictions @ 1Q10

Depth = 1.1918 ft
Length = 4067.97 ft
Velocity = .371 ft/sec
Residence Time = 3.0459 hours

Recommendation:

A complete mix assumption is appropriate for this situation providing no more than 32.83% of the 1Q10 is used.

Virginia DEQ Mixing Zone Analysis Version 2.1

pH/Temp Data for DEQ Monitoring Station 3-RAP045.08
(April 2007--December 2010)

Station ID	Collection Date & Time	Temp (C)	pH (SU)
3-RAP045.08	2-Apr-07	14.5	7.9
3-RAP045.08	11-Jun-07	24.8	7.7
3-RAP045.08	20-Aug-07	24.3	7.3
3-RAP045.08	1-Oct-07	18.4	7.5
3-RAP045.08	17-Dec-07	4.2	7.5
3-RAP045.08	4-Feb-08	5.6	7.3
3-RAP045.08	7-Apr-08	10.6	7.2
3-RAP045.08	23-Jun-08	24.6	7.6
3-RAP045.08	25-Aug-08	25.7	7.4
3-RAP045.08	27-Oct-08	11.3	7.2
3-RAP045.08	8-Dec-08	0.9	7.6
3-RAP045.08	4-Feb-09	2.3	7.4
3-RAP045.08	20-Apr-09	13.4	7.1
3-RAP045.08	22-Jun-09	23.1	7.1
3-RAP045.08	20-Aug-09	27	7.3
3-RAP045.08	13-Oct-09	15.2	7.4
3-RAP045.08	17-Dec-09	4.1	7.1
3-RAP045.08	16-Feb-10	1.9	7.1
3-RAP045.08	12-Apr-10	16.1	7.6
3-RAP045.08	7-Jun-10	24.6	7.4
3-RAP045.08	16-Aug-10	26.7	7.3
3-RAP045.08	9-Dec-10	0.6	7.3
90th Percentile		**25.61**	**7.6**
10th Percentile		**1.94**	**7.1**

Attachment 7

90th Percentile Effluent pH Values
The Town of Orange WWTP (VA0021385)
Feb 2010 through January 2011

Due	CONC MAX
10-Feb-11	8
10-Jan-11	8.2
10-Dec-10	8
10-Nov-10	7.9
10-Oct-10	8.1
10-Sep-10	7.1
10-Aug-10	7.1
10-Jul-10	7.2
10-Jun-10	7
10-May-10	7.1
10-Apr-10	6.9
10-Mar-10	7.3
90th Percentile pH	**8.09**

90th percentile values based upon 12 consecutive monthly maximum values

ESS
Environmental Systems Service, Ltd.

January 26, 2011

Michelle Steinberger
Town of Orange WWTP
13222 Spicers Mill Road
Orange, VA 22960

Re: Outfall 001 Attachement A Sampling 2010 – Metals Data

Dear Michelle:

Environmental Systems Service, Ltd. (ESS) is pleased to submit the results for clean metals sampling conducted on November 11, 2010. All samples were grab samples and were filtered on the field using a 0.45 micron filter. Metals were analyzed by Albion Environmental.

Parameter	Reported Level (ppb)
	Dissolved
Antimony	0.392
Arsenic	<1.0
Beryllium	<0.50
Cadmium	<0.10
Chromium	<1.0
Copper	1.86
Lead	0.227
Mercury	0.001
Nickel	1.52
Selenium	<2.00
Silver	<0.10
Titanium	<0.10
Zinc	57.3

ESS appreciates the opportunity to provide clean sampling and analytical services. If you have any questions, please feel free to contact me at 540-825-6660.

Sincerely,

Andria Swann, Environmental Technician
Environmental Services Division

218 North Main Street * P.O. Box 520* Culpeper, Virginia 22701-0520* Telephone 540-825-666

Attachment 8

CERTIFICATE OF ANALYSIS
M.J. Reider Associates, Inc.

November 2010 data

12/14/10

Attention: Angie Woodward
Reported To: Environmental Systems Service, Ltd.
P.O. Box 520
Culpeper VA 22701

Town of Orange w/off 13150

Sample Desc: WW ESS# 41663

Date of Report: 12/08/10
Project Number: 1046671
Lab ID: 1677-10-0041921
Date Collected: 11/15/10 00:00
Collected By: CLIENT
Date Received: 11/15/10 09:30

	Result	Unit	Rep. Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
ORGANIC								
ACID COMPOUNDS								
2,4,6-Trichlorophenol	<10	ug/l	10	1	EPA 625	12/05	18:18	MEB
2,4-Dichlorophenol	<10	ug/l	10	1	EPA 625	12/05	18:18	MEB
2,4-Dimethylphenol	<10	ug/l	10	1	EPA 625	12/05	18:18	MEB
2,4-Dinitrophenol	<10	ug/l	10	1	EPA 625	12/05	18:18	MEB
2-Chlorophenol	<10	ug/l	10	1	EPA 625	12/05	18:18	MEB
2-Nitrophenol	<10	ug/l	10	1	EPA 625	12/05	18:18	MEB
4,6-Dinitro-o-cresol	<10	ug/l	10	1	EPA 625	12/05	18:18	MEB
4-Chloro-3-methylphenol	<10	ug/l	10	1	EPA 625	12/05	18:18	MEB
4-Nitrophenol	<10	ug/l	10	1	EPA 625	12/05	18:18	MEB
Pentachlorophenol	<10	ug/l	10	1	EPA 625	12/05	18:18	MEB
Phenol	<10	ug/l	10	1	EPA 625	12/05	18:18	MEB
BASE NEUTRALS								
1,2,4-Trichlorobenzene	<10	ug/l	10	1	EPA 625	12/05	18:18	MEB
1,2-Diphenylhydrazine (as Azobenzene)	<10	ug/l	10	1	EPA 625	12/05	18:18	MEB
2,3,7,8-Tetrachlorodibenzodioxin	See Comment	ug/l	40	1	EPA 625	12/05	18:18	MEB
2,4-Dinitrotoluene	<10	ug/l	10	1	EPA 625	12/05	18:18	MEB
2,6-Dinitrotoluene	<10	ug/l	10	1	EPA 625	12/05	18:18	MEB
2-Chloronaphthalene	<10	ug/l	10	1	EPA 625	12/05	18:18	MEB
3,3'-Dichlorobenzidine	<10	ug/l	10	1	EPA 625	12/05	18:18	MEB
3,4-Benzofluoranthene	<10	ug/l	10	1	EPA 625	12/05	18:18	MEB
4-Bromophenyl phenyl ether	<10	ug/l	10	1	EPA 625	12/05	18:18	MEB
4-Chlorophenyl phenyl ether	<10	ug/l	10	1	EPA 625	12/05	18:18	MEB
Acenaphthene	<10	ug/l	10	1	EPA 625	12/05	18:18	MEB
Acenaphthylene	<10	ug/l	10	1	EPA 625	12/05	18:18	MEB
Anthracene	<10	ug/l	10	1	EPA 625	12/05	18:18	MEB
Benzidine	<10	ug/l	10	1	EPA 625	12/05	18:18	MEB
Benzo(a)anthracene	<10	ug/l	10	1	EPA 625	12/05	18:18	MEB
Benzo(a)pyrene	<10	ug/l	10	1	EPA 625	12/05	18:18	MEB

Distribution of Reports:

Reviewed and Approved by:

Christina M. Kistler

Christina Kistler
Technical Director

ENVIRONMENTAL TESTING LABORATORY 107 ANGELICA STREET, READING, PA 19611
PHONE: 610-374-5129 • FAX: 610-374-7234 • www.mjreider.com

Attention: Angie Woodward
Reported To: Environmental Systems Service, Ltd.
P.O. Box 520
Culpeper VA 22701

Date of Report: 12/08/10
Project Number: 1046671
Lab ID: 1677-10-0041921
Date Collected: 11/15/10 00:00
Collected By: CLIENT
Date Received: 11/15/10 09:30

Sample Desc: WW ESS# 41663

	Result	Unit	Rep. Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
Benzo(b)fluoranthene	<10	ug/l	10	1	EPA 625	12/05	18:18	MEB
Benzo(ghi)perylene	<10	ug/l	10	1	EPA 625	12/05	18:18	MEB
Benzo(k)fluoranthene	<10	ug/l	10	1	EPA 625	12/05	18:18	MEB
Bis(2-chloroethoxy)methane	<10	ug/l	10	1	EPA 625	12/05	18:18	MEB
Bis(2-Chloroethyl) ether	<10	ug/l	10	1	EPA 625	12/05	18:18	MEB
Bis(2-Chloroisopropyl) ether	<10	ug/l	10	1	EPA 625	12/05	18:18	MEB
Bis(2-Ethylhexyl) phthalate	<10	ug/l	10	1	EPA 625	12/05	18:18	MEB
Butyl benzyl phthalate	<10	ug/l	10	1	EPA 625	12/05	18:18	MEB
Chrysene	<10	ug/l	10	1	EPA 625	12/05	18:18	MEB
Di-n-butyl phthalate	<10	ug/l	10	1	EPA 625	12/05	18:18	MEB
Di-n-octyl phthalate	<10	ug/l	10	1	EPA 625	12/05	18:18	MEB
Dibenz(a,h)anthracene	<10	ug/l	10	1	EPA 625	12/05	18:18	MEB
Diethyl phthalate	<10	ug/l	10	1	EPA 625	12/05	18:18	MEB
Dimethyl phthalate	<10	ug/l	10	1	EPA 625	12/05	18:18	MEB
Fluoranthrene	<10	ug/l	10	1	EPA 625	12/05	18:18	MEB
Fluorene	<10	ug/l	10	1	EPA 625	12/05	18:18	MEB
Hexachlorobenzene	<10	ug/l	10	1	EPA 625	12/05	18:18	MEB
Hexachlorobutadiene	<10	ug/l	10	1	EPA 625	12/05	18:18	MEB
Hexachlorocyclopentadiene	<10	ug/l	10	1	EPA 625	12/05	18:18	MEB
Hexachloroethane	<10	ug/l	10	1	EPA 625	12/05	18:18	MEB
Indeno(1,2,3-cd)pyrene	<10	ug/l	10	1	EPA 625	12/05	18:18	MEB
Isophorone	<10	ug/l	10	1	EPA 625	12/05	18:18	MEB
N-Nitrosodi-n-propylamine	<10	ug/l	10	1	EPA 625	12/05	18:18	MEB
N-Nitrosodimethylamine	<10	ug/l	10	1	EPA 625	12/05	18:18	MEB
N-Nitrosodiphenylamine	<10	ug/l	10	1	EPA 625	12/05	18:18	MEB
Naphthalene	<10	ug/l	10	1	EPA 625	12/05	18:18	MEB
Nitrobenzene	<10	ug/l	10	1	EPA 625	12/05	18:18	MEB
Phenanthrene	<10	ug/l	10	1	EPA 625	12/05	18:18	MEB
Pyrene	<10	ug/l	10	1	EPA 625	12/05	18:18	MEB
EXTRACTION								

Distribution of Reports:

Reviewed and Approved by:

Christina Kistler
Technical Director

ENVIRONMENTAL TESTING LABORATORY 107 ANGELICA STREET, READING, PA 19611
PHONE: 610-374-5129 • FAX: 610-374-7234 • www.mjreider.com

CERTIFICATE OF ANALYSIS
M.J. Reider Associates, Inc.

Attention: Angie Woodward
Reported To: Environmental Systems Service, Ltd.
P.O. Box 520
Culpeper VA 22701

Date of Report: 12/08/10
Project Number: 1046671
Lab ID: 1677-10-0041921
Date Collected: 11/15/10 00:00
Collected By: CLIENT
Date Received: 11/15/10 09:30

Sample Desc: WW ESS# 41663

	Result	Unit	Rep. Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
EPA 625 Extraction								
VOLATILES		Complete	1	1	EPA 625	12/05	18:18	MEB
1,1,1-Trichloroethane	<5	ug/l	5	1	EPA 624	11/16	09:16	GXF
1,1,2,2-Tetrachloroethane	<5	ug/l	5	1	EPA 624	11/16	09:16	GXF
1,1,2-Trichloroethane	<5	ug/l	5	1	EPA 624	11/16	09:16	GXF
1,1-Dichloroethane	<5	ug/l	5	1	EPA 624	11/16	09:16	GXF
1,1-Dichloroethylene	<5	ug/l	5	1	EPA 624	11/16	09:16	GXF
1,2-Dichlorobenzene (o-Dichlorobenzene)	<5	ug/l	5	1	EPA 624	11/16	09:16	GXF
1,2-Dichloroethane	<5	ug/l	5	1	EPA 624	11/16	09:16	GXF
1,2-Dichloropropane	<5	ug/l	5	1	EPA 624	11/16	09:16	GXF
1,3-Dichlorobenzene	<5	ug/l	5	1	EPA 624	11/16	09:16	GXF
1,4-Dichlorobenzene	<5	ug/l	5	1	EPA 624	11/16	09:16	GXF
2-Chloroethylvinyl Ether	<5	ug/l	5	1	EPA 624	11/16	09:16	GXF
Acrolein	<10	ug/l	10	1	EPA 624	11/16	09:16	GXF
Acrylonitrile	<10	ug/l	10	1	EPA 624	11/16	09:16	GXF
Benzene	<5	ug/l	5	1	EPA 624	11/16	09:16	GXF
Bromoform (Tribromomethane)	<5	ug/l	5	1	EPA 624	11/16	09:16	GXF
Bromomethane (Methyl Bromide)	<10	ug/l	10	1	EPA 624	11/16	09:16	GXF
Carbon Tetrachloride	<5	ug/l	5	1	EPA 624	11/16	09:16	GXF
Chlorobenzene (Monochlorobenzene)	<5	ug/l	5	1	EPA 624	11/16	09:16	GXF
Chlorodibromomethane	<5	ug/l	5	1	EPA 624	11/16	09:16	GXF
Chloroethane	<10	ug/l	10	1	EPA 624	11/16	09:16	GXF
Chloroform	<5	ug/l	5	1	EPA 624	11/16	09:16	GXF
Chloromethane (Methyl Chloride)	<10	ug/l	10	1	EPA 624	11/16	09:16	GXF
cis-1,3-Dichloropropylene	<5	ug/l	5	1	EPA 624	11/16	09:16	GXF
Dichlorobromomethane	<5	ug/l	5	1	EPA 624	11/16	09:16	GXF
Ethylbenzene	<5	ug/l	5	1	EPA 624	11/16	09:16	GXF
Methylene Chloride	<5	ug/l	5	1	EPA 624	11/16	09:16	GXF
Tetrachloroethylene	<5	ug/l	5	1	EPA 624	11/16	09:16	GXF
Toluene	<5	ug/l	5	1	EPA 624	11/16	09:16	GXF

Distribution of Reports:

Reviewed and Approved by:

Christina Kistler
Technical Director

ENVIRONMENTAL TESTING LABORATORY 107 ANGELICA STREET, READING, PA 19611
PHONE: 610-374-5129 • FAX: 610-374-7234 • www.mjreider.com

Attention: Angie Woodward
Reported To: Environmental Systems Service, Ltd.
P.O. Box 520
Culpeper VA 22701

Date of Report: 12/08/10
Project Number: 1046671
Lab ID: 1677-10-0041921
Date Collected: 11/15/10 00:00
Collected By: CLIENT
Date Received: 11/15/10 09:30

Sample Desc: WW ESS# 41663

	Result	Unit	Rep. Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
trans-1,2-Dichloroethylene	<5	ug/l	5	1	EPA 624	11/16	09:16	GXF
trans-1,3-Dichloropropylene	<5	ug/l	5	1	EPA 624	11/16	09:16	GXF
Trichloroethylene	<5	ug/l	5	1	EPA 624	11/16	09:16	GXF
Trichlorofluoromethane	<5	ug/l	5	1	EPA 624	11/16	09:16	GXF
Vinyl Chloride	<10	ug/l	10	1	EPA 624	11/16	09:16	GXF
Xylenes (Total)	<5	ug/l	5	1	EPA 624	11/16	09:16	GXF

COMMENTS

01 The semi-volatile extract was analyzed for 2,3,7,8-Tetrachlorodibenzo-p-dioxin. There was no indication of the characteristic ion in the extract.

02 One or more semi-volatile compounds had high recovery in the CCV but none of these compounds were detected in this sample above the laboratory's reporting limit.

03 In the EPA 625 analysis, Benzidine and 3,3-Dichlorobenzidine were low in the CCV,however they passed the QC criteria.

Distribution of Reports:

Reviewed and Approved by:

Christina M. Kistler

Christina Kistler
Technical Director

ENVIRONMENTAL TESTING LABORATORY 107 ANGELICA STREET, READING, PA 19611
PHONE: 610-374-5129 • FAX: 610-374-7234 • www.mjreider.com

February 18, 2011

Michelle Steinberger
Town of Orange WWTP
13222 Spicers Mill Road
Orange, VA 22960

Re: Outfall 001 Attachement A Sampling: Second Round 2010 – Metals Data

Dear Michelle:

Environmental Systems Service, Ltd. (ESS) is pleased to submit the results for clean metals sampling conducted on December 28, 2010. All samples were grab samples and were filtered on the field using a 0.45 micron filter. Metals were analyzed by Albion Environmental. Attachments include raw data for all metals anaylysis.

Parameter	Reported Level (ppb)
	Dissolved
Antimony	0.31
Arsenic	<1.0
Beryllium	<0.50
Cadmium	<0.10
Chromium	1.96
Copper	2.40
Lead	2.03
Mercury	0.00093
Nickel	1.47
Selenium	<2.00
Silver	<0.10
Thallium	<0.10
Zinc	68.0

ESS appreciates the opportunity to provide clean sampling and analytical services. If you have any questions, please feel free to contact me at 540-825-6660.

Sincerely,

Andria Swann, Environmental Technician
Environmental Services Division

Attachments

Dec 2010 Data

CERTIFICATE OF ANALYSIS
M.J. Reider Associates, Inc.

Town of Orange
W/O 14125

AMENDED

Attention: Angie Woodward
Reported To: Environmental Systems Service, Ltd.
P.O. Box 520
Culpeper VA 22701

Date of Report: 02/03/11
Project Number: 1049756
Lab ID: 1677-10-0046779
Date Collected: 12/28/10 00:00
Collected By: CLIENT
Date Received: 12/29/10 09:30

Sample Desc: 43737 Outfall 001

	Result	Unit	Rep. Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
ORGANIC								
ACID COMPOUNDS								
2,4,6-Trichlorophenol	<10	ug/l	10	1	EPA 625	01/03	15:28	MEB
2,4-Dichlorophenol	<10	ug/l	10	1	EPA 625	01/03	15:28	MEB
2,4-Dimethylphenol	<10	ug/l	10	1	EPA 625	01/03	15:28	MEB
2,4-Dinitrophenol	<10	ug/l	10	1	EPA 625	01/03	15:28	MEB
2-Chlorophenol	<10	ug/l	10	1	EPA 625	01/03	15:28	MEB
2-Nitrophenol	<10	ug/l	10	1	EPA 625	01/03	15:28	MEB
4,6-Dinitro-o-cresol	<10	ug/l	10	1	EPA 625	01/03	15:28	MEB
4-Chloro-3-methylphenol	<10	ug/l	10	1	EPA 625	01/03	15:28	MEB
4-Nitrophenol	<10	ug/l	10	1	EPA 625	01/03	15:28	MEB
Pentachlorophenol	<10	ug/l	10	1	EPA 625	01/03	15:28	MEB
Phenol	<10	ug/l	10	1	EPA 625	01/03	15:28	MEB
BASE NEUTRALS								
1,2,4-Trichlorobenzene	<10	ug/l	10	1	EPA 625	01/03	15:28	MEB
1,2-Diphenylhydrazine (as Azobenzene)	<10	ug/l	10	1	EPA 625	01/03	15:28	MEB
2,3,7,8-Tetrachlorodibenzodioxin	see comment	ug/l	10	1	EPA 625	01/03	15:28	MEB
2,4-Dinitrotoluene	<10	ug/l	10	1	EPA 625	01/03	15:28	MEB
2,6-Dinitrotoluene	<10	ug/l	10	1	EPA 625	01/03	15:28	MEB
2-Chloronaphthalene	<10	ug/l	10	1	EPA 625	01/03	15:28	MEB
3,3'-Dichlorobenzidine	<10	ug/l	10	1	EPA 625	01/03	15:28	MEB
3,4-Benzofluoranthene	<10	ug/l	10	1	EPA 625	01/03	15:28	MEB
4-Bromophenyl phenyl ether	<10	ug/l	10	1	EPA 625	01/03	15:28	MEB
4-Chlorophenyl phenyl ether	<10	ug/l	10	1	EPA 625	01/03	15:28	MEB
Acenaphthene	<10	ug/l	10	1	EPA 625	01/03	15:28	MEB
Acenaphthylene	<10	ug/l	10	1	EPA 625	01/03	15:28	MEB
Anthracene	<10	ug/l	10	1	EPA 625	01/03	15:28	MEB
Benzidine	<10	ug/l	10	1	EPA 625	01/03	15:28	MEB
Benzo(a)anthracene	<10	ug/l	10	1	EPA 625	01/03	15:28	MEB
Benzo(a)pyrene	<10	ug/l	10	1	EPA 625	01/03	15:28	MEB

Distribution of Reports:

Reviewed and Approved by:

Christina M. Kistler

Christina Kistler
Technical Director

RECEIVED FEB 0 8 2011

ENVIRONMENTAL TESTING LABORATORY 107 ANGELICA STREET, READING, PA 19611
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Attention: Angie Woodward
Reported To: Environmental Systems Service, Ltd.
P.O. Box 520
Culpeper VA 22701

AMENDED

Date of Report: 02/03/11
Project Number: 1049756
Lab ID: 1677-10-0046779
Date Collected: 12/28/10 00:00
Collected By: CLIENT
Date Received: 12/29/10 09:30

Sample Desc: 43737 Outfall 001

	Result	Unit	Rep. Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
Benzo(b)fluoranthene	<10	ug/l	10	1	EPA 625	01/03	15:28	MEB
Benzo(ghi)perylene	<10	ug/l	10	1	EPA 625	01/03	15:28	MEB
Benzo(k)fluoranthene	<10	ug/l	10	1	EPA 625	01/03	15:28	MEB
Bis(2-chloroethoxy)methane	<10	ug/l	10	1	EPA 625	01/03	15:28	MEB
Bis(2-Chloroethyl) ether	<10	ug/l	10	1	EPA 625	01/03	15:28	MEB
Bis(2-Chloroisopropyl) ether	<10	ug/l	10	1	EPA 625	01/03	15:28	MEB
Bis(2-Ethylhexyl) phthalate	<10	ug/l	10	1	EPA 625	01/03	15:28	MEB
Butyl benzyl phthalate	<10	ug/l	10	1	EPA 625	01/03	15:28	MEB
Chrysene	<10	ug/l	10	1	EPA 625	01/03	15:28	MEB
Di-n-butyl phthalate	<10	ug/l	10	1	EPA 625	01/03	15:28	MEB
Di-n-octyl phthalate	<10	ug/l	10	1	EPA 625	01/03	15:28	MEB
Dibenz(a,h)anthracene	<10	ug/l	10	1	EPA 625	01/03	15:28	MEB
Diethyl phthalate	<10	ug/l	10	1	EPA 625	01/03	15:28	MEB
Dimethyl phthalate	<10	ug/l	10	1	EPA 625	01/03	15:28	MEB
Fluoranthrene	<10	ug/l	10	1	EPA 625	01/03	15:28	MEB
Fluorene	<10	ug/l	10	1	EPA 625	01/03	15:28	MEB
Hexachlorobenzene	<10	ug/l	10	1	EPA 625	01/03	15:28	MEB
Hexachlorobutadiene	<10	ug/l	10	1	EPA 625	01/03	15:28	MEB
Hexachlorocyclopentadiene	<10	ug/l	10	1	EPA 625	01/03	15:28	MEB
Hexachloroethane	<10	ug/l	10	1	EPA 625	01/03	15:28	MEB
Indeno(1,2,3-cd)pyrene	<10	ug/l	10	1	EPA 625	01/03	15:28	MEB
Isophorone	<10	ug/l	10	1	EPA 625	01/03	15:28	MEB
N-Nitrosodi-n-propylamine	<10	ug/l	10	1	EPA 625	01/03	15:28	MEB
N-Nitrosodimethylamine	<10	ug/l	10	1	EPA 625	01/03	15:28	MEB
N-Nitrosodiphenylamine	<10	ug/l	10	1	EPA 625	01/03	15:28	MEB
Naphthalene	<10	ug/l	10	1	EPA 625	01/03	15:28	MEB
Nitrobenzene	<10	ug/l	10	1	EPA 625	01/03	15:28	MEB
Phenanthrene	<10	ug/l	10	1	EPA 625	01/03	15:28	MEB
Pyrene	<10	ug/l	10	1	EPA 625	01/03	15:28	MEB
EXTRACTION								

Distribution of Reports:

Reviewed and Approved by:

Christina Kistler
Technical Director

ENVIRONMENTAL TESTING LABORATORY 107 ANGELICA STREET, READING, PA 19611
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Attention: Angie Woodward
Reported To: Environmental Systems Service, Ltd.
P.O. Box 520
Culpeper VA 22701

AMENDED

Date of Report: 02/03/11
Project Number: 1049756
Lab ID: 1677-10-0046779
Date Collected: 12/28/10 00:00
Collected By: CLIENT
Date Received: 12/29/10 09:30

Sample Desc: 43737 Outfall 001

	Result	Unit	Rep. Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
EPA 625 Extraction		Complete	1	1	EPA 625	12/30	09:00	MEB
VOLATILES								
1,1,1-Trichloroethane	<5	ug/l	5	1	EPA 624	01/03	09:54	GXF
1,1,2,2-Tetrachloroethane	<5	ug/l	5	1	EPA 624	01/03	09:54	GXF
1,1,2-Trichloroethane	<5	ug/l	5	1	EPA 624	01/03	09:54	GXF
1,1-Dichloroethane	<5	ug/l	5	1	EPA 624	01/03	09:54	GXF
1,1-Dichloroethylene	<5	ug/l	5	1	EPA 624	01/03	09:54	GXF
1,2-Dichlorobenzene (o-Dichlorobenzene)	<5	ug/l	5	1	EPA 624	01/03	09:54	GXF
1,2-Dichloroethane	<5	ug/l	5	1	EPA 624	01/03	09:54	GXF
1,2-Dichloropropane	<5	ug/l	5	1	EPA 624	01/03	09:54	GXF
1,3-Dichlorobenzene	<5	ug/l	5	1	EPA 624	01/03	09:54	GXF
1,3-Dichloropropene	<5	ug/l	5	1	EPA 624	01/03	09:54	GXF
1,4-Dichlorobenzene	<5	ug/l	5	1	EPA 624	01/03	09:54	GXF
2-Chloroethylvinyl Ether	<5	ug/l	5	1	EPA 624	01/03	09:54	GXF
Acrolein	<10	ug/l	10	1	EPA 624	01/03	09:54	GXF
Acrylonitrile	<10	ug/l	10	1	EPA 624	01/03	09:54	GXF
Benzene	<5	ug/l	5	1	EPA 624	01/03	09:54	GXF
Bromoform (Tribromomethane)	<5	ug/l	5	1	EPA 624	01/03	09:54	GXF
Bromomethane (Methyl Bromide)	<10	ug/l	10	1	EPA 624	01/03	09:54	GXF
Carbon Tetrachloride	<5	ug/l	5	1	EPA 624	01/03	09:54	GXF
Chlorobenzene (Monochlorobenzene)	<5	ug/l	5	1	EPA 624	01/03	09:54	GXF
Chlorodibromomethane	<5	ug/l	5	1	EPA 624	01/03	09:54	GXF
Chloroethane	<10	ug/l	10	1	EPA 624	01/03	09:54	GXF
Chloroform	<5	ug/l	5	1	EPA 624	01/03	09:54	GXF
Chloromethane (Methyl Chloride)	<10	ug/l	10	1	EPA 624	01/03	09:54	GXF
cis-1,3-Dichloropropylene	<5	ug/l	5	1	EPA 624	01/03	09:54	GXF
Dichlorobromomethane	<5	ug/l	5	1	EPA 624	01/03	09:54	GXF
Ethylbenzene	<5	ug/l	5	1	EPA 624	01/03	09:54	GXF
Methylene Chloride	<5	ug/l	5	1	EPA 624	01/03	09:54	GXF
Tetrachloroethylene	<5	ug/l	5	1	EPA 624	01/03	09:54	GXF

Distribution of Reports:

Reviewed and Approved by:

Christina M. Kistler

Christina Kistler
Technical Director

ENVIRONMENTAL TESTING LABORATORY 107 ANGELICA STREET, READING, PA 19611
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CERTIFICATE OF ANALYSIS
M.J. Reider Associates, Inc.

Attention: Angie Woodward
Reported To: Environmental Systems Service, Ltd.
P.O. Box 520
Culpeper VA 22701

AMENDED

Date of Report: 02/03/11
Project Number: 1049756
Lab ID: 1677-10-0046779
Date Collected: 12/28/10 00:00
Collected By: CLIENT
Date Received: 12/29/10 09:30

Sample Desc: 43737 Outfall 001

	Result	Unit	Rep. Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
Toluene	<5	ug/l	5	1	EPA 624	01/03	09:54	GXF
trans-1,2-Dichloroethylene	<5	ug/l	5	1	EPA 624	01/03	09:54	GXF
Trichloroethylene	<5	ug/l	5	1	EPA 624	01/03	09:54	GXF
Trichlorofluoromethane	<5	ug/l	5	1	EPA 624	01/03	09:54	GXF
Vinyl Chloride	<10	ug/l	10	1	EPA 624	01/03	09:54	GXF
Xylenes (Total)	<5	ug/l	5	1	EPA 624	01/03	09:54	GXF

COMMENTS

01 One or more semi-volatile compounds had high recovery in the CCV but none of these compounds were detected in this sample above the laboratory's reporting limit.

02 The epa 625 method QC duplicate was high for Chrysene but the QC was fine.

03 The semi-volatile extract was analyzed for 2,3,7,8-Tetrachlorodibenzo-p-dioxin. There was no indication of the characteristic ion in the extract.

Distribution of Reports:

Reviewed and Approved by:

Christina M. Kistler

Christina Kistler
Technical Director

ENVIRONMENTAL TESTING LABORATORY 107 ANGELICA STREET, READING, PA 19611
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Total Recoverable Copper Monitoring from DMRs
Town of Orange WWTP (VA0021385)
(July 2006 – January 2011)

Due	CONC MAX
2/10/11	5
1/10/11	5
12/10/10	5
11/10/10	5
10/10/10	20
9/10/10	18
8/10/10	16
7/10/10	20
6/10/10	17
5/10/10	31
4/10/10	14
3/10/10	<4
2/10/10	14
1/10/10	14
12/10/09	12
11/10/09	54
10/10/09	14
9/10/09	16
8/10/09	24
7/10/09	12
6/10/09	17
5/10/09	11
4/10/09	24
3/10/09	32
2/10/09	37
1/10/09	13
12/10/08	19
11/10/08	13
10/10/08	17
9/10/08	19
8/10/08	9
7/10/08	12
6/10/08	9
5/10/08	14
4/10/08	16
3/10/08	11
2/10/08	18
1/10/08	19
12/10/07	11
11/10/07	36
10/10/07	18
9/10/07	20
8/10/07	99
7/10/07	16
6/10/07	11
5/10/07	15
4/10/07	22
3/10/07	28
2/10/07	24
1/10/07	11
12/10/06	8
11/10/06	12
10/10/06	14
9/10/06	18
8/10/06	16

3/30/2011 4:17:08 PM

Facility = Town of Orange WWTP
Chemical = Ammonia
Chronic averaging period = 30
WLAa = 7.7
WLAc = 5.6
Q.L. = .2
# samples/mo. = 20
# samples/wk. = 5

Summary of Statistics:

observations = 1
Expected Value = 9
Variance = 29.16
C.V. = 0.6
97th percentile daily values = 21.9007
97th percentile 4 day average = 14.9741
97th percentile 30 day average= 10.8544
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Acute Toxicity
Maximum Daily Limit = 7.7
Average Weekly limit = 5.01853906206572
Average Monthly LImit = 3.9628186142073

The data are:

9

2/17/2011 3:46:14 PM

Facility = The Town of Orange WWTP
Chemical = TRC
Chronic averaging period = 4
WLAa = 20
WLAc = 21
Q.L. = 100
# samples/mo. = 30
# samples/wk. = 8

Summary of Statistics:

observations = 1
Expected Value = 200
Variance = 14400
C.V. = 0.6
97th percentile daily values = 486.683
97th percentile 4 day average = 332.758
97th percentile 30 day average= 241.210
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Acute Toxicity
Maximum Daily Limit = 20
Average Weekly limit = 11.9301017180445
Average Monthly LImit = 9.91242327735359

The data are:

200

2/17/2011 4:02:29 PM

Facility = The Town of Orange WWTP
Chemical = Copper
Chronic averaging period = 30
WLAa = 9.6
WLAc = 9.1
Q.L. = .3
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 54
Expected Value = 18.3353
Variance = 119.021
C.V. = 0.595009
97th percentile daily values = 44.3823
97th percentile 4 day average = 30.3928
97th percentile 30 day average= 22.0819
< Q.L. = 0
Model used = lognormal

A limit is needed based on Acute Toxicity
Maximum Daily Limit = 9.6
Average Weekly limit = 9.6
Average Monthly LImit = 9.6

The data are:

5
5
5
5
20
18
16
20
17
31
14
14
14
12
54
14
16
24
12
17

11
24
32
37
13
19
13
17
19
9
12
9
14
16
11
18
19
11
36
18
20
99
16
11
15
22
28
24
11
8
12
14
18
16

3/8/2011 4:39:53 PM

Facility = Town of Orange WWTP
Chemical = Chromium
Chronic averaging period = 4
WLAa = 430
WLAc = 77
Q.L. = 1
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 1.96
Variance = 1.38297
C.V. = 0.6
97th percentile daily values = 4.76949
97th percentile 4 day average = 3.26102
97th percentile 30 day average= 2.36386
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

1.96

3/8/2011 4:41:00 PM

Facility = Town of Orange WWTP
Chemical = Lead
Chronic averaging period = 4
WLAa = 75
WLAc = 10
Q.L. = 0.050
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 2
Expected Value = 1.1285
Variance = .458464
C.V. = 0.6
97th percentile daily values = 2.74611
97th percentile 4 day average = 1.87758
97th percentile 30 day average= 1.36103
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

0.227
2.03

3/8/2011 4:42:53 PM

Facility = Town of Orange WWTP
Chemical = Mercury
Chronic averaging period = 4
WLAa = 1.5
WLAc = 1.5
Q.L. = .0005
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 2
Expected Value = .000965
Variance = .000000
C.V. = 0.6
97th percentile daily values = .002348
97th percentile 4 day average = .001605
97th percentile 30 day average= .001163
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

0.001
0.00093

3/8/2011 4:44:06 PM

Facility = Town of Orange WWTP
Chemical = Nickel
Chronic averaging period = 4
WLAa = 140
WLAc = 21
Q.L. = 1
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 2
Expected Value = 1.495
Variance = .804609
C.V. = 0.6
97th percentile daily values = 3.63795
97th percentile 4 day average = 2.48736
97th percentile 30 day average= 1.80304
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

1.52
1.47

3/8/2011 4:45:40 PM

Facility = Town of Orange WWTP
Chemical = Zinc
Chronic averaging period = 4
WLAa = 87
WLAc = 120
Q.L. = 0.5
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 2
Expected Value = 62.65
Variance = 1413.00
C.V. = 0.6
97th percentile daily values = 152.453
97th percentile 4 day average = 104.236
97th percentile 30 day average= 75.5592
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Acute Toxicity
Maximum Daily Limit = 87
Average Weekly limit = 87
Average Monthly LImit = 87

The data are:

57.3
68

REGIONAL MODELING SYSTEM VERSION 4.0

Model Input File for the Discharge to RAPIDAN RIVER.

File Information

File Name:	C:\My Documents\Town of Orange DO Model.mod
Date Modified:	March 30, 2011

Water Quality Standards Information

Stream Name:	RAPIDAN RIVER
River Basin:	Rappahannock River Basin
Section:	4
Class:	III - Nontidal Waters (Coastal and Piedmont)
Special Standards:	None

Background Flow Information

Gauge Used:	01665500
Gauge Drainage Area:	114 Sq.Mi.
Gauge 7Q10 Flow:	2.5852 MGD
Headwater Drainage Area:	233 Sq.Mi.
Headwater 7Q10 Flow:	7.884 MGD (Net; includes Withdrawals/Discharges)
Withdrawal/Discharges:	2.6 MGD
Incremental Flow in Segments:	2.267719E-02 MGD/Sq.Mi.

Background Water Quality

Background Temperature:	25 Degrees C
Background cBOD5:	2 mg/l
Background TKN:	0 mg/l
Background D.O.:	7.414762 mg/l

Model Segmentation

Number of Segments:	1
Model Start Elevation:	331 ft above MSL
Model End Elevation:	315 ft above MSL

Attachment 10

REGIONAL MODELING SYSTEM VERSION 4.0

Model Input File for the Discharge to RAPIDAN RIVER.

Segment Information for Segment 1

Definition Information

Segment Definition:	A discharge enters.
Discharge Name:	TOWN OF ORANGE WWTP
VPDES Permit No.:	

Discharger Flow Information

Flow:	3 MGD
cBOD5:	10 mg/l
TKN:	7 mg/l
D.O.:	6 mg/l
Temperature:	25 Degrees C

Geographic Information

Segment Length:	3.1 miles
Upstream Drainage Area:	233 Sq.Mi.
Downstream Drainage Area:	0 Sq.Mi.
Upstream Elevation:	331 Ft.
Downstream Elevation:	315 Ft.

Hydraulic Information

Segment Width:	80.001 Ft.
Segment Depth:	0.862 Ft.
Segment Velocity:	0.244 Ft./Sec.
Segment Flow:	10.884 MGD
Incremental Flow:	-5.284 MGD (Applied at end of segment.)

Channel Information

Cross Section:	Rectangular
Character:	Moderately Meandering
Pool and Riffle:	Yes
Percent Pools:	40
Percent Riffles:	60
Pool Depth:	1 Ft.
Riffle Depth:	0.7 Ft.
Bottom Type:	Large Rock
Sludge:	None
Plants:	Few
Algae:	None

"Model Run For C:\My Documents\Town of Orange DO Model.mod On 3/30/2011 4:40:47 PM"

"Model is for RAPIDAN RIVER."
"Model starts at the TOWN OF ORANGE WWTP discharge."

"Background Data"

"7Q10"	"cBOD5"	"TKN"	"DO"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
7.884,	2,	0,	7.415,	25

"Discharge/Tributary Input Data for Segment 1"

"Flow"	"cBOD5"	"TKN"	"DO"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
3,	10,	7,	,6,	25

"Hydraulic Information for Segment 1"

"Length"	"Width"	"Depth"	"Velocity"
"(mi)"	"(ft)"	"(ft)"	"(ft/sec)"
3.1,	80.001,	.862,	.244

"Initial Mix Values for Segment 1"

"Flow"	"DO"	"cBOD"	"nBOD"	"DOSat"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
10.884,	7.025,	10.513,	4.774,	8.241,	25

"Rate Constants for Segment 1. - (All units Per Day)"

"k1",	"k1@T",	"k2",	"k2@T",	"kn",	"kn@T",	"BD",	"BD@T"
.5,	.629,	3.097,	3.487,	.15,	.22,	0,	0

"Output for Segment 1"
"Segment starts at TOWN OF ORANGE WWTP"

"Total" "Dist."	"Segm." "Dist."	"DO"	"cBOD"	"nBOD"
"(mi)",	"(mi)",	"(mg/l)",	"(mg/l)",	"(mg/l)"
0,	0,	7.025,	10.513,	4.774
.1,	.1,	6.944,	10.349,	4.748
.2,	.2,	6.873,	10.187,	4.722
.3,	.3,	6.81,	10.028,	4.696
.4,	.4,	6.755,	9.871,	4.67
.5,	.5,	6.707,	9.717,	4.644
.6,	.6,	6.665,	9.565,	4.618
.7,	.7,	6.629,	9.415,	4.593
.8,	.8,	6.599,	9.268,	4.568
.9,	.9,	6.574,	9.123,	4.543
1,	1,	6.553,	8.98,	4.518
1.1,	1.1,	6.536,	8.84,	4.493
1.2,	1.2,	6.523,	8.702,	4.468
1.3,	1.3,	6.513,	8.566,	4.443
1.4,	1.4,	6.506,	8.432,	4.419
1.5,	1.5,	6.502,	8.3,	4.395
1.6,	1.6,	6.5,	8.17,	4.371
1.7,	1.7,	6.5,	8.042,	4.347
1.8,	1.8,	6.502,	7.916,	4.323
1.9,	1.9,	6.506,	7.792,	4.299
2,	2,	6.512,	7.67,	4.275
2.1,	2.1,	6.519,	7.55,	4.251
2.2,	2.2,	6.528,	7.432,	4.228
2.3,	2.3,	6.538,	7.316,	4.205
2.4,	2.4,	6.549,	7.202,	4.182
2.5,	2.5,	6.561,	7.089,	4.159
2.6,	2.6,	6.573,	6.978,	4.136
2.7,	2.7,	6.586,	6.869,	4.113
2.8,	2.8,	6.6,	6.762,	4.09

modout.txt

2.9,	2.9,	6.614,	6.656,	4.067
3,	3,	6.629,	6.552,	4.045
3.1,	3.1,	6.644,	6.45,	4.023

"END OF FILE"

Spreadsheet for determination of WET test endpoints or WET limits

Excel 97
Revision Date: 01/10/05
File: WETLIM10.xls
(MIX.EXE required also)

Acute Endpoint/Permit Limit			Use as LC_{50} in Special Condition, as TUa on DMR			
ACUTE	100% =	NOAEC	LC_{50} = NA	% Use as	NA	TUa
ACUTE WLAa		0.30312	Note: Inform the permittee that if the mean of the data exceeds this TUa: 1.0 a limit may result using WLA.EXE			

Chronic Endpoint/Permit Limit			Use as NOEC in Special Condition, as TUc on DMR			
CHRONIC	2.437624473	TU_c	NOEC =	42 % Use as	2.38	TU_c
BOTH*	3.031200074	TU_c	NOEC =	33 % Use as	3.03	TU_c
AML	2.437624473	TU_c	NOEC =	42 % Use as	2.38	TU_c
ACUTE WLAa,c		3.0312	Note: Inform the permittee that if the mean of the data exceeds this TUc: 1.00172879 a limit may result using WLA.EXE			
CHRONIC WLAc		1.66666667				
* Both means acute expressed as chronic						

Enter data in the cells with blue type:

Entry Date:	02/17/11
Facility Name:	Orange WWTP
VPDES Number:	VA0021385
Outfall Number:	1

		% Flow to be used from MIX.EXE	**Difuser /modeling study?**	
Plant Flow:	3 MGD		Enter Y/N	N
Acute 1Q10:	0.8 MGD	3.9 %	Acute	1 :1
Chronic 7Q10:	2 MGD	100 %	Chronic	1 :1

Are data available to calculate CV? (Y/N) N (Minimum of 10 data points, same species, needed) Go to Page 2
Are data available to calculate ACR? (Y/N) N (NOEC<LC50, do not use greater/less than data) Go to Page 3

IWC_a	98.97070467 %	Plant flow/plant flow + 1Q10	NOTE: If the IWCa is >33%, specify the NOAEC = 100% test/endpoint for use
IWC_c	60 %	Plant flow/plant flow + 7Q10	
Dilution, acute	1.0104	100/IWCa	
Dilution, chronic	1.666666667	100/IWCc	

WLA_a	0.30312	Instream criterion (0.3 TUa) X's Dilution, acute
WLA_c	1.666666667	Instream criterion (1.0 TUc) X's Dilution, chronic
$WLA_{a,c}$	3.0312	ACR X's WLA_a - converts acute WLA to chronic units
ACR -acute/chronic ratio	10	LC50/NOEC (Default is 10 - if data are available, use tables Page 3)
CV-Coefficient of variation	0.6	Default of 0.6 - if data are available, use tables Page 2)
Constants eA	0.4109447	Default = 0.41
eB	0.6010373	Default = 0.60
eC	2.4334175	Default = 2.43
eD	2.4334175	Default = 2.43 (1 samp) No. of samples: 1

****The Maximum Daily Limit is calculated from the lowest LTA, X's eC. The LTAa,c and MDL using it are driven by the ACR.**

						Rounded NOEC's	%
$LTA_{a,c}$	1.245655575	WLAa,c X's eA					
LTA_c	1.001728833	WLAc X's eB					
MDL** with $LTA_{a,c}$	3.031200074	TU_c	NOEC =	32.990234	(Protects from acute/chronic toxicity)	NOEC =	33 %
MDL** with LTA_c	2.437624473	TU_c	NOEC =	41.023546	(Protects from chronic toxicity)	NOEC =	42 %
AML with lowest LTA	2.437624473	TU_c	NOEC =	41.023546	Lowest LTA X's eD	NOEC =	42

IF ONLY ACUTE ENDPOINT/LIMIT IS NEEDED, CONVERT MDL FROM TU_c to TU_a

						Rounded LC50's	%
MDL with $LTA_{a,c}$	0.303120007	TU_a	LC50 =	329.902341 %	Use NOAEC=100%	LC50 = NA	%
MDL with LTA_c	0.243762447	TU_a	LC50 =	410.235461 %	Use NOAEC=100%	LC50 = NA	

Attachment 11

Page 2 - Follow the directions to develop a site specific CV (coefficient of variation)

IF YOU HAVE AT LEAST 10 DATA POINTS THAT ARE QUANTIFIABLE (NOT "<" OR ">") FOR A SPECIES, ENTER THE DATA IN EITHER COLUMN "G" (VERTEBRATE) OR COLUMN "J" (INVERTEBRATE). THE 'CV' WILL BE PICKED UP FOR THE CALCULATIONS BELOW. THE DEFAULT VALUES FOR eA, eB, AND eC WILL CHANGE IF THE 'CV' IS ANYTHING OTHER THAN 0.6.

	Vertebrate IC_{25} Data or LC_{50} Data **********	LN of data	Invertebrate IC_{25} Data or LC_{50} Data **********	LN of data
1	0		0	
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				

Coefficient of Variation for effluent tests

CV = 0.6 (Default 0.6)

δ^2 = 0.3074847
δ = 0.554513029

Using the log variance to develop eA
(P. 100, step 2a of TSD)
Z = 1.881 (97% probability stat from table
A = -0.88929666
eA = 0.410944686

Using the log variance to develop eB
(P. 100, step 2b of TSD)
δ_4^2 = 0.086177696
δ_4 = 0.293560379
B = -0.50909823
eB = 0.601037335

St Dev	NEED DATA	NEED DATA
Mean	0	0
Variance	0	0.000000
CV	0	

St Dev	NEED DATA	NEED DATA
Mean	0	0
Variance	0	0.000000
CV	0	

Using the log variance to develop eC
(P. 100, step 4a of TSD)

δ^2 = 0.3074847
δ = 0.554513029
C = 0.889296658
eC = 2.433417525

Using the log variance to develop eD
(P. 100, step 4b of TSD)
n = 1 This number will most likely stay as "1", for 1 sample/month.
δ_n^2 = 0.3074847
δ_n = 0.554513029
D = 0.889296658
eD = 2.433417525

Page 3 - Follow directions to develop a site specific ACR (Acute to Chronic Ratio)

To determine Acute/Chronic Ratio (ACR), insert usable data below. Usable data is defined as valid paired test results, acute and chronic, tested at the same temperature, same species. The chronic NOEC must be less than the acute LC_{50}, since the ACR divides the LC_{50} by the NOEC. LC_{50}'s >100% should not be used.

Table 1. ACR using Vertebrate data

Set #	LC_{50}	NOEC	Test ACR	Logarithm	Geomean	Antilog	ACR to Use
1	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
2	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
3	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
4	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
5	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
6	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
7	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
8	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
9	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
10	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA

ACR for vertebrate data: 0

Table 1. Result:	Vertebrate ACR	0
Table 2. Result:	Invertebrate ACR	0
	Lowest ACR	Default to 10

Table 2. ACR using Invertebrate data

Set #	LC_{50}	NOEC	Test ACR	Logarithm	Geomean	Antilog	ACR to Use
1	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
2	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
3	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
4	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
5	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
6	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
7	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
8	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
9	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA
10	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	NO DATA

ACR for vertebrate data: 0

Convert LC_{50}'s and NOEC's to Chronic TU's for use in WLA.EXE

Table 3. ACR used: 10

	Enter LC_{50}	TUc	Enter NOEC	TUc
1		NO DATA		NO DATA
2		NO DATA		NO DATA
3		NO DATA		NO DATA
4		NO DATA		NO DATA
5		NO DATA		NO DATA
6		NO DATA		NO DATA
7		NO DATA		NO DATA
8		NO DATA		NO DATA
9		NO DATA		NO DATA
10		NO DATA		NO DATA
11		NO DATA		NO DATA
12		NO DATA		NO DATA
13		NO DATA		NO DATA
14		NO DATA		NO DATA
15		NO DATA		NO DATA
16		NO DATA		NO DATA
17		NO DATA		NO DATA
18		NO DATA		NO DATA
19		NO DATA		NO DATA
20		NO DATA		NO DATA

If WLA.EXE determines that an acute limit is needed, you need to convert the TUc answer you get to TUa and then an LC50, enter it here: NO DATA %LC_{50}

NO DATA TUa

DILUTION SERIES TO RECOMMEND

Table 4.

	Monitoring		Limit	
	% Effluent	TUc	% Effluent	TUc
Dilution series based on data mean	99.8	1.001729		
Dilution series to use for limit			42	2.3809524
Dilution factor to recommend:	0.9991367		0.6480741	
Dilution series to recommend:	100.0	1.00	100.0	1.00
	99.9	1.00	64.8	1.54
	99.8	1.00	42.0	2.38
	99.7	1.00	27.2	3.67
	99.66	1.00	17.6	5.67
Extra dilutions if needed	99.57	1.00	11.4	8.75
	99.48	1.01	7.4	13.50

Cell: I9
Comment:
This is assuming that the data are Type 2 data (none of the data in the data set are censored - "<" or ">").

Cell: K18
Comment: This is assuming that the data are Type 2 data (none of the data in the data set are censored - "<" or ">").

Cell: J22
Comment: Remember to change the "N" to "Y" if you have ratios entered, otherwise, they won't be used in the calculations.

Cell: C40
Comment:
If you have entered data to calculate an ACR on page 3, and this is still defaulted to "10", make sure you have selected "Y" in cell E21

Cell: C41
Comment: If you have entered data to calculate an effluent specific CV on page 2, and this is still defaulted to "0.6", make sure you have selected "Y" in cell E20

Cell: L48
Comment:
See Row 151 for the appropriate dilution series to use for these NOEC's

Cell: G62
Comment:
Vertebrates are:
Pimephales promelas
Oncorhynchus mykiss
Cyprinodon variegatus

Cell: J62
Comment:
Invertebrates are:
Ceriodaphnia dubia
Mysidopsis bahia

Cell: C117
Comment: Vertebrates are:

Pimephales promelas
Cyprinodon variegatus

Cell: M119
Comment: The ACR has been picked up from cell C34 on Page 1. If you have paired data to calculate an ACR, enter it in the tables to the left, and make sure you have a "Y" in cell E21 on Page 1. Otherwise, the default of 10 will be used to convert your acute data.

Cell: M121
Comment: If you are only concerned with acute data, you can enter it in the NOEC column for conversion and the number calculated will be equivalent to the TUa. The calculation is the same: 100/NOEC = TUc or 100/LC50 = TUa.

Cell: C138
Comment: Invertebrates are:

Ceriodaphnia dubia
Mysidopsis bahia

Public Notice – Environmental Permit

PURPOSE OF NOTICE: To seek public comment on a draft permit from the Department of Environmental Quality that will allow the release of treated wastewater into a water body in the Town of Orange, Virginia.

PUBLIC COMMENT PERIOD: July 1, 2011 to 5:00 p.m. on August 1, 2011

PERMIT NAME: Virginia Pollutant Discharge Elimination System Permit – Wastewater issued by DEQ, under the authority of the State Water Control Board

APPLICANT NAME, ADDRESS AND PERMIT NUMBER: Town of Orange, 119 Belleview Avenue, Orange, VA 22960; VA0021385

NAME AND ADDRESS OF FACILITY: The Town of Orange WWTP, 13222 Spicer's Mill Road, Orange, VA 22960

PROJECT DESCRIPTION: The Town of Orange has applied for a reissuance of a permit for the public Town of Orange WWTP. The applicant proposes to release treated sewage wastewater from a small town consisting of residential areas and businesses at a rate of 3.0 million gallons per day into a water body. The sludge will be disposed by placement in a landfill. The facility proposes to release the sewage into the Rapidan River in the Town of Orange in the Rappahannock River watershed. A watershed is the land area drained by a river and its incoming streams. The permit will limit the following pollutants to amounts that protect water quality: pH, $cBOD_5$, Total Suspended Solids, Dissolved Oxygen, Total Kjeldahl Nitrogen, *E. coli*, Nitrate+Nitrite, Total Nitrogen, Total Phosphorus, Total Residual Chlorine, Total Recoverable Copper, Total Recoverable Zinc, and Chronic Toxicity.

This facility is subject to the requirements of 9 VAC 25-820 and has registered for coverage under the General VPDES Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Watershed in Virginia.

HOW TO COMMENT AND/OR REQUEST A PUBLIC HEARING: DEQ accepts comments and requests for public hearing by e-mail, fax or postal mail. All comments and requests must be in writing and be received by DEQ during the comment period. Submittals must include the names, mailing addresses and telephone numbers of the commenter/requester and of all persons represented by the commenter/requester. A request for public hearing must also include: 1) The reason why a public hearing is requested. 2) A brief, informal statement regarding the nature and extent of the interest of the requester or of those represented by the requestor, including how and to what extent such interest would be directly and adversely affected by the permit. 3) Specific references, where possible, to terms and conditions of the permit with suggested revisions. If public response is significant and there are substantial, disputed issues relevant to the permit,, a public hearing, to include another comment period, may be held based on individual requests for a public hearing,

CONTACT FOR PUBLIC COMMENTS, DOCUMENT REQUESTS AND ADDITIONAL INFORMATION: The public may review the documents at the DEQ Northern Regional Office by appointment or may request electronic copies of the draft permit and fact sheet.
Name: Anna T. Westernik
13901 Crown Court, Woodbridge, VA 22193
Phone: (703) 583-3837 E-mail: atwesternik@deq.virginia.gov Fax: (703) 583-3821

APPENDIX A
SCHEDULE OF COMPLIANCE

The Town of Orange agrees to:

1. By no later than November 1, 2005, submit to DEQ for review and approval Copper and I&I Study Plans including study schedules. The purpose of the Copper Study will be to identify, if possible, any large individual source(s) of copper leading to elevated copper concentrations within the collection system. For any such sources that are identified, the Town shall identify options for source control, estimate associated costs and benefits, and submit to DEQ a proposed plan of corrective action including an implementation schedule. The purpose of the I&I Study will be to identify the Town's long-term strategy for addressing I&I issues within the collection system and the ultimate impact it has on the STP and its performance.

2. By no later than November 1, 2005, submit to DEQ a Preliminary Financial Feasibility Report for construction of the BNR Plant. The report shall provide an analysis of and preliminary findings as to whether the BNR Plant is financially feasible (taking into account relevant factors such as limits on the Town's bonding capacity and the impact of the project on the affordability of sewer rates), whether the BNR Plant is financially dependent upon WQIF grant funding, and a cost comparison between the two projects (i.e., constructing the BNR Plant versus upgrading the existing 1.5 MGD STP to meeting all limits including anticipated nitrogen and phosphorus limits).

3. As soon as possible, apply for a grant from the Water Quality Improvement Fund for design and construction of the BNR Plant taking into account the additional costs associated with changing from the existing trickling filter technology to activated sludge and biological nutrient removal technology.

4. By no later than March 1, 2006, submit to DEQ, for review and approval, the Final Financial Feasibility Report for construction of the BNR Plant. The report shall provide an analysis of and findings as to whether the BNR Plant is financially feasible (taking into account relevant factors such as limits on the Town's bonding capacity and the impact of the project on the affordability of sewer rates), whether the BNR Plant is financially dependent upon WQIF grant funding and a cost comparison between the two projects. If the BNR Plant is financially feasible, the Town shall comply with the deadlines in paragraphs 6 through 10 below for beginning construction, completing the expansion, requesting a CTO, and achieving compliance with Permit effluent limits. If the approved Report indicates that the BNR Plant is not financially feasible, the Town shall submit to DEQ for review and approval, no later than June 1, 2006, an alternative plan and schedule to achieve compliance with Permit effluent limits for Copper by no later than December 31, 2009.

5. By no later than November 1, 2005, submit to DEQ an approvable Preliminary Engineering Report (PER), for review and approval, for the BNR Plant.

6. By no later than September 1, 2006, or within one hundred eighty (180) days of approval of the PER if the PER is not approved on or before March 1, 2006, submit plans and specifications for the BNR Plant to DEQ for review and approval.

7. Within one hundred twenty (120) days of approval of the plans and specifications by the DEQ, begin construction of the BNR Plant.

8. Submit quarterly construction project progress reports to NVRO with the Discharge Monitoring Report (DMR) submission and continue to operate the STP in accordance with the Operations and Maintenance (O&M) manual and the Sludge Management Plan (SMP) in order to ensure that the STP produces the best quality effluent of which it is capable, and in order to minimize any additional exceedences of Permit effluent limits and impacts to water quality that may occur while the BNR Plant is under construction. Should the Town engineer's assessment indicate that any interim additions or changes need to be made to STP's treatment units and/or equipment to consistently comply with effluent limits during the period of construction, the Town must first submit to DEQ the plans and specifications for such changes or additions, for review and approval, prior to implementation.

9. By no later than September 30, 2010, complete construction of the BNR Plant in accordance with the approved plans and specifications and request a Certificate to Operate (CTO) from DEQ.

10. By no later than December 31, 2010, achieve compliance with Permit effluent limits at the BNR Plant.

11. During the period beginning with the effective date of this Order and lasting though completion of construction and the three month start up period in accordance with the schedule outlined herein, the Town shall comply with the interim limits in Appendix B in lieu of the comparable limits in the Permit.

Revised 2/2003

State "Transmittal Checklist" to Assist in Targeting
Municipal and Industrial Individual NPDES Draft Permits for Review

Part I. State Draft Permit Submission Checklist

In accordance with the MOA established between the Commonwealth of Virginia and the United States Environmental Protection Agency, Region III, the Commonwealth submits the following draft National Pollutant Discharge Elimination System (NPDES) permit for Agency review and concurrence.

Facility Name:	The Town of Orange WWTP
NPDES Permit Number:	VA00021385
Permit Writer Name:	Anna Westernik
Date:	March 15, 2011

Major [ ] **Minor** [X] **Industrial** [ ] **Municipal** [x]

I.A. Draft Permit Package Submittal Includes:	**Yes**	**No**	**N/A**
1. Permit Application?	x		
2. Complete Draft Permit (for renewal or first time permit – entire permit, including boilerplate information)?	x		
3. Copy of Public Notice?	x		
4. Complete Fact Sheet?	x		
5. A Priority Pollutant Screening to determine parameters of concern?	x		
6. A Reasonable Potential analysis showing calculated WQBELs?	x		
7. Dissolved Oxygen calculations?	x		
8. Whole Effluent Toxicity Test summary and analysis?	x		
9. Permit Rating Sheet for new or modified industrial facilities?			x

I.B. Permit/Facility Characteristics	**Yes**	**No**	**N/A**
1. Is this a new, or currently unpermitted facility?		x	
2. Are all permissible outfalls (including combined sewer overflow points, non-process water and storm water) from the facility properly identified and authorized in the permit?*	x		
3. Does the fact sheet **or** permit contain a description of the wastewater treatment process?	x		
4. Does the review of PCS/DMR data for at least the last 3 years indicate significant non-compliance with the existing permit?		x	
5. Has there been any change in streamflow characteristics since the last permit was developed?		x	
6. Does the permit allow the discharge of new or increased loadings of any pollutants?		x	
7. Does the fact sheet **or** permit provide a description of the receiving water body(s) to which the facility discharges, including information on low/critical flow conditions and designated/existing uses?	x		
8. Does the facility discharge to a 303(d) listed water?	x		
a. Has a TMDL been developed and approved by EPA for the impaired water?	x		
b. Does the record indicate that the TMDL development is on the State priority list and will most likely be developed within the life of the permit?			x
c. Does the facility discharge a pollutant of concern identified in the TMDL or 303(d) listed water?	x		
9. Have any limits been removed, or are any limits less stringent, than those in the current permit?		x	
10. Does the permit authorize discharges of storm water?		x	
*VAR051419, the Storm Water General Permit, authorizes discharge from storm water outfalls			

Attachment 14

I.B. Permit/Facility Characteristics – cont.	Yes	No	N/A
11. Has the facility substantially enlarged or altered its operation or substantially increased its flow or production?	x		
12. Are there any production-based, technology-based effluent limits in the permit?		x	
13. Do any water quality-based effluent limit calculations differ from the State's standard policies or procedures?		x	
14. Are any WQBELs based on an interpretation of narrative criteria?		x	
15. Does the permit incorporate any variances or other exceptions to the State's standards or regulations?	x		
16. Does the permit contain a compliance schedule for any limit or condition?	x		
17. Is there a potential impact to endangered/threatened species or their habitat by the facility's discharge(s)?	x		
18. Have impacts from the discharge(s) at downstream potable water supplies been evaluated?	x		
19. Is there any indication that there is significant public interest in the permit action proposed for this facility?		x	
20. Have previous permit, application, and fact sheet been examined?	x		

Part II. NPDES Draft Permit Checklist

Region III NPDES Permit Quality Checklist – for POTWs

(To be completed and included in the record only for POTWs)

II.A. Permit Cover Page/Administration	**Yes**	**No**	**N/A**
1. Does the fact sheet or permit describe the physical location of the facility, including latitude and longitude (not necessarily on permit cover page)?	x		
2. Does the permit contain specific authorization-to-discharge information (from where to where, by whom)?	x		

II.B. Effluent Limits – General Elements	**Yes**	**No**	**N/A**
1. Does the fact sheet describe the basis of final limits in the permit (e.g., that a comparison of technology and water quality-based limits was performed, and the most stringent limit selected)?	x		
2. Does the fact sheet discuss whether "antibacksliding" provisions were met for any limits that are less stringent than those in the previous NPDES permit?			x

II.C. Technology-Based Effluent Limits (POTWs)	**Yes**	**No**	**N/A**
1. Does the permit contain numeric limits for ALL of the following: BOD (or alternative, e.g., CBOD, COD, TOC), TSS, and pH?	x		
2. Does the permit require at least 85% removal for BOD (or BOD alternative) and TSS (or 65% for equivalent to secondary) consistent with 40 CFR Part 133?	x		
a. If no, does the record indicate that application of WQBELs, or some other means, results in more stringent requirements than 85% removal or that an exception consistent with 40 CFR 133.103 has been approved?			x
3. Are technology-based permit limits expressed in the appropriate units of measure (e.g., concentration, mass, SU)?	x		
4. Are permit limits for BOD and TSS expressed in terms of both long term (e.g., average monthly) and short term (e.g., average weekly) limits?	x		
5. Are any concentration limitations in the permit less stringent than the secondary treatment requirements (30 mg/l BOD5 and TSS for a 30-day average and 45 mg/l BOD5 and TSS for a 7-day average)?		x	
a. If yes, does the record provide a justification (e.g., waste stabilization pond, trickling filter, etc.) for the alternate limitations?			x

II.D. Water Quality-Based Effluent Limits	**Yes**	**No**	**N/A**
1. Does the permit include appropriate limitations consistent with 40 CFR 122.44(d) covering State narrative and numeric criteria for water quality?	x		
2. Does the fact sheet indicate that any WQBELs were derived from a completed and EPA approved TMDL? (monitoring for PCBs only)		x	
3. Does the fact sheet provide effluent characteristics for each outfall?	x		
4. Does the fact sheet document that a "reasonable potential" evaluation was performed?	x		
a. If yes, does the fact sheet indicate that the "reasonable potential" evaluation was performed in accordance with the State's approved procedures?	x		
b. Does the fact sheet describe the basis for allowing or disallowing in-stream dilution or a mixing zone?	x		
c. Does the fact sheet present WLA calculation procedures for all pollutants that were found to have "reasonable potential"?	x		
d. Does the fact sheet indicate that the "reasonable potential" and WLA calculations accounted for contributions from upstream sources (i.e., do calculations include ambient/background concentrations)?		x	
e. Does the permit contain numeric effluent limits for all pollutants for which "reasonable potential" was determined?	x		

II.D. Water Quality-Based Effluent Limits – cont.	Yes	No	N/A
5. Are all final WQBELs in the permit consistent with the justification and/or documentation provided in the fact sheet?	x		
6. For all final WQBELs, are BOTH long-term AND short-term effluent limits established?	x		
7. Are WQBELs expressed in the permit using appropriate units of measure (e.g., mass, concentration)?	x		
8. Does the record indicate that an "antidegradation" review was performed in accordance with the State's approved antidegradation policy?	x		

II.E. Monitoring and Reporting Requirements	Yes	No	N/A
1. Does the permit require at least annual monitoring for all limited parameters and other monitoring as required by State and Federal regulations?	x		
a. If no, does the fact sheet indicate that the facility applied for and was granted a monitoring waiver, AND, does the permit specifically incorporate this waiver?			
2. Does the permit identify the physical location where monitoring is to be performed for each outfall?	x		
3. Does the permit require at least annual influent monitoring for BOD (or BOD alternative) and TSS to assess compliance with applicable percent removal requirements?	x		
4. Does the permit require testing for Whole Effluent Toxicity?	x		

II.F. Special Conditions	Yes	No	N/A
1. Does the permit include appropriate biosolids use/disposal requirements?	x		
2. Does the permit include appropriate storm water program requirements?*			x

II.F. Special Conditions – cont.	Yes	No	N/A
3. If the permit contains compliance schedule(s), are they consistent with statutory and regulatory deadlines and requirements?	x		
4. Are other special conditions (e.g., ambient sampling, mixing studies, TIE/TRE, BMPs, special studies) consistent with CWA and NPDES regulations?	x		
5. Does the permit allow/authorize discharge of sanitary sewage from points other than the POTW outfall(s) or CSO outfalls [i.e., Sanitary Sewer Overflows (SSOs) or treatment plant bypasses]?		x	
6. Does the permit authorize discharges from Combined Sewer Overflows (CSOs)?		x	
a. Does the permit require implementation of the "Nine Minimum Controls"?			x
b. Does the permit require development and implementation of a "Long Term Control Plan"?			x
c. Does the permit require monitoring and reporting for CSO events?			x
7. Does the permit include appropriate Pretreatment Program requirements?	x		

*Requirements in Storm Water General Permit

II.G. Standard Conditions	Yes	No	N/A
1. Does the **permit** contain all 40 CFR 122.41 standard conditions or the State equivalent (or more stringent) conditions?	x		

List of Standard Conditions – 40 CFR 122.41

Duty to comply	Property rights	Reporting Requirements
Duty to reapply	Duty to provide information	Planned change
Need to halt or reduce activity not a defense	Inspections and entry	Anticipated noncompliance
Duty to mitigate	Monitoring and records	Transfers
Proper O & M	Signatory requirement	Monitoring reports
Permit actions	Bypass	Compliance schedules
	Upset	24-Hour reporting
		Other non-compliance

2. Does the permit contain the additional standard condition (or the State equivalent or more stringent conditions) for POTWs regarding notification of new introduction of pollutants and new industrial users [40 CFR 122.42(b)]?	x		

Part II. NPDES Draft Permit Checklist

Region III NPDES Permit Quality Review Checklist – For Non-Municipals

(To be completed and included in the record for all non-POTWs)

II.A. Permit Cover Page/Administration	**Yes**	**No**	**N/A**
1. Does the fact sheet **or** permit describe the physical location of the facility, including latitude and longitude (not necessarily on permit cover page)?			
2. Does the permit contain specific authorization-to-discharge information (from where to where, by whom)?			

II.B. Effluent Limits – General Elements	**Yes**	**No**	**N/A**
1. Does the fact sheet describe the basis of final limits in the permit (e.g., that a comparison of technology and water quality-based limits was performed, and the most stringent limit selected)?			
2. Does the fact sheet discuss whether "antibacksliding" provisions were met for any limits that are less stringent than those in the previous NPDES permit?			

II.C. Technology-Based Effluent Limits (Effluent Guidelines & BPJ)	**Yes**	**No**	**N/A**
1. Is the facility subject to a national effluent limitations guideline (ELG)?			
a. If yes, does the record adequately document the categorization process, including an evaluation of whether the facility is a new source or an existing source?			
b. If no, does the record indicate that a technology-based analysis based on Best Professional Judgement (BPJ) was used for all pollutants of concern discharged at treatable concentrations?			
2. For all limits developed based on BPJ, does the record indicate that the limits are consistent with the criteria established at 40 CFR 125.3(d)?			
3. Does the fact sheet adequately document the calculations used to develop both ELG and /or BPJ technology-based effluent limits?			
4. For all limits that are based on production or flow, does the record indicate that the calculations are based on a "reasonable measure of ACTUAL production" for the facility (not design)?			
5. Does the permit contain "tiered" limits that reflect projected increases in production or flow?			
a. If yes, does the permit require the facility to notify the permitting authority when alternate levels of production or flow are attained?			
6. Are technology-based permit limits expressed in appropriate units of measure (e.g., concentration, mass, SU)?			
7. Are all technology-based limits expressed in terms of both maximum daily, weekly average, and/or monthly average limits?			
8. Are any final limits less stringent than required by applicable effluent limitations guidelines or BPJ?			

II.D. Water Quality-Based Effluent Limits	**Yes**	**No**	**N/A**
1. Does the permit include appropriate limitations consistent with 40 CFR 122.44(d) covering State narrative and numeric criteria for water quality?			
2. Does the record indicate that any WQBELs were derived from a completed and EPA approved TMDL?			
3. Does the fact sheet provide effluent characteristics for each outfall?			
4. Does the fact sheet document that a "reasonable potential" evaluation was performed?			
a. If yes, does the fact sheet indicate that the "reasonable potential" evaluation was performed in accordance with the State's approved procedures?			
b. Does the fact sheet describe the basis for allowing or disallowing in-stream dilution or a mixing zone?			

II.D. Water Quality-Based Effluent Limits – cont.	Yes	No	N/A
c. Does the fact sheet present WLA calculation procedures for all pollutants that were found to have "reasonable potential"?			
d. Does the fact sheet indicate that the "reasonable potential" and WLA calculations accounted for contributions from upstream sources (i.e., do calculations include ambient/background concentrations where data are available)?			
e. Does the permit contain numeric effluent limits for all pollutants for which "reasonable potential" was determined?			
5. Are all final WQBELs in the permit consistent with the justification and/or documentation provided in the fact sheet?			
6. For all final WQBELs, are BOTH long-term (e.g., average monthly) AND short-term (e.g., maximum daily, weekly average, instantaneous) effluent limits established?			
7. Are WQBELs expressed in the permit using appropriate units of measure (e.g., mass, concentration)?			
8. Does the fact sheet indicate that an "antidegradation" review was performed in accordance with the State's approved antidegradation policy?			

II.E. Monitoring and Reporting Requirements	Yes	No	N/A
1. Does the permit require at least annual monitoring for all limited parameters?			
a. If no, does the fact sheet indicate that the facility applied for and was granted a monitoring waiver, AND, does the permit specifically incorporate this waiver?			
2. Does the permit identify the physical location where monitoring is to be performed for each outfall?			
3. Does the permit require testing for Whole Effluent Toxicity in accordance with the State's standard practices?			

II.F. Special Conditions	Yes	No	N/A
1. Does the permit require development and implementation of a Best Management Practices (BMP) plan or site-specific BMPs?			
a. If yes, does the permit adequately incorporate and require compliance with the BMPs?			
2. If the permit contains compliance schedule(s), are they consistent with statutory and regulatory deadlines and requirements?			
3. Are other special conditions (e.g., ambient sampling, mixing studies, TIE/TRE, BMPs, special studies) consistent with CWA and NPDES regulations?			

II.G. Standard Conditions	Yes	No	N/A
1. Does the **permit** contain all 40 CFR 122.41 standard conditions or the State equivalent (or more stringent) conditions?			

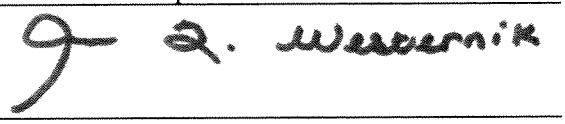
List of Standard Conditions – 40 CFR 122.41

Duty to comply	Property rights	Reporting Requirements
Duty to reapply	Duty to provide information	Planned change
Need to halt or reduce activity not a defense	Inspections and entry	Anticipated noncompliance
	Monitoring and records	Transfers
Duty to mitigate	Signatory requirement	Monitoring reports
Proper O & M	Bypass	Compliance schedules
Permit actions	Upset	24-Hour reporting
		Other non-compliance

2. Does the permit contain the additional standard condition (or the State equivalent or more stringent conditions) for existing non-municipal dischargers regarding pollutant notification levels [40 CFR 122.42(a)]?			

Part III. Signature Page

Based on a review of the data and other information submitted by the permit applicant, and the draft permit and other administrative records generated by the Department/Division and/or made available to the Department/Division, the information provided on this checklist is accurate and complete, to the best of my knowledge.

Name	Anna Westernik
Title	Environmental Specialist II
Signature	
Date	March 15, 2011